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ABSTRACT

This report examines the supply of and demand for health care professionals in the state of Georgia, including information on education, demographics, and workforce changes. Supply data analyzed included licensure and certification records; a survey of Georgia's major health care institutions provided demand data. Additionally, institutions of higher education were contacted for graduate and enrollment data. Data reported include vacancy rates, practitioner-to-population ratios over time, educational productivity, urban and rural comparisons, and projections of future demand and growth. An introductory chapter is followed by a chapter on trends in population and health care resources. The remaining chapters report on the supply of and demand for the following professions: physicians, physician assistants, registered nurses, advanced practice nurses, nurse practitioners, clinical nurse specialists, nurse midwives, nurse anesthetists, licensed practical nurses, physical therapists, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists, radiologists, radiation therapists, specialists in diagnostic medical sonography, specialists in nuclear medical technology, medical technologists, health information administrators and technologists, specialists in surgical technology, dietitians, pharmacists, and social workers. A concluding chapter notes growth in training programs and supply of health care workers across all fields. (Contains approximately 75 references.) (DB)

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Georgia's Health Professions: A Decade of Change 1985-1995

Libby V. Morris, Ph.D.
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Institute of Higher Education
Athens, Georgia

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Introduction

Although the health status of a population is affected by many factors, including life-styles, educational backgrounds, and socioeconomic status, an essential component for improving the health status of a population is the accessibility of health care professionals. Overall, an adequate number of physicians, allied health care professionals, and health care institutions must be present in a region to address problems of geographic and economic access. Additionally, primary care professionals are central to the emerging model of *health care as prevention* as well as the more traditional model of *health care as treatment*. Consequently, continuing education, geographic accessibility of health care providers, and economic access are key elements in the delivery of quality health care services.

The first comprehensive study of health personnel in Georgia was conducted in 1962 by Cameron Fincher, now Regents Professor and Director of the Institute of Higher Education, the University of Georgia. This study, entitled *Nursing and Paramedical Personnel in Georgia*, was funded jointly by the University System of Georgia (USGA) Board of Regents, the Georgia Department of Education, and the Georgia Department of Public Health. It inventoried nursing and "paramedical manpower" in twelve occupations to determine whether health education and training programs were sufficient to maintain adequate professional supply.

The current study into workforce supply and demand issues continues this investigation, as the third in a series of health professions studies begun in 1985. The first study, *Health Professions Personnel in Georgia*, was completed in 1986 and was funded by the Georgia Student Finance Authority to assess the supply of and demand for health professions personnel in Georgia. Over 30 health care professions were examined for the purpose of developing recommendations to use in setting and revising student financial aid policy in the health fields. The report was subsequently used by educators, health care professional groups, policymakers, and academic advisors as a reference work for the health fields in Georgia. Because of the number of professions studied, and the extent of the primary data collection, this study was one of the most comprehensive to date in Georgia.

The second study was completed in 1991, and served as a five-year update for the 1986 report. *Education and the Workforce: Georgia's Health Professions in the 1990s* extended the 1986 study by revisiting the critical questions of supply and demand posed, by examining changes in occupational supply and demand over time, and by examining urban and rural differences in the workforce.

The intervening five years have been a time of great change for the state and for the health care professions. Technological advances, as well as changing economic conditions, have led to restructuring in health care delivery systems. Educational programs founded since 1986 have added to the supply of health care professionals, while employment demand in institutional settings has remained stable or decreased in several occupations. This study once again builds upon previous research into the health professions, and its purposes are to assist educational planning, financial aid decision-making, and individual career choices so that Georgia's health care workforce may reach a reasonable balance between supply and demand. Extensive support for this and previous health professions studies conducted by the author was provided by the Institute of Higher Education.

Design of the Study

This study examined the supply of and demand for professionals across a wide range of health careers (Table 1). The prerequisite educational levels ranged from postgraduate study and residencies for physicians to one year of postsecondary education for occupations such as practical nursing. A variety of databases were consulted to examine the supply of health care providers in Georgia, as no comprehensive database exists that fully represents Georgia's health care workforce. Several statewide studies, however, beginning as early as the 1960s have stressed the need for such a database and discussed its importance to educational and health care planning (Fincher, 1965; Morris, 1987, 1992; Governor's Health Care Commission, 1993). Currently, health professions' data in Georgia are fragmented across a broad spectrum of agencies, boards, and associations; and the availability and reliability of the data vary considerably by occupation. Consequently, a variety of methods, sources, and databases were employed to assess the supply of and demand for health care

TABLE 1
HEALTH PROFESSIONS OCCUPATIONS, 1995

Physicians - Primary Care Personnel
- Family Practice
- Internal Medicine
- General Surgery
- Pediatrics
- Obstetrics-Gynecology

Physician Assistant

Nursing
- Registered Nurse
- Nurse Practitioner
- Nurse Anesthetist
- Nurse-Midwife
- Licensed Practical Nurse

Therapy
- Physical Therapist
- Physical Therapy Assistant
- Occupational Therapist
- Occupational Therapy Assistant
- Respiratory Care Therapist

Diagnostic and Radiologic
- Radiographer
- Diagnostic Medical Sonographer
- Nuclear Medicine Technologist
- Radiation Therapy Technologist

Health Information Technology
- Health Information Manager
- Health Information Technologist

Clinical Laboratory Sciences
- Medical Technologist
- Medical Laboratory Technician

Other Allied Health
- Surgical Technologist
- Dietitian
- Social Worker
- Pharmacist

Several approaches were used to assess the supply of and demand for health professionals in this state. Licensure data from the State of Georgia and certification data from professional registries were used to examine supply in several occupations. The State of Georgia Examining Boards issue and renew licenses for many health care occupations; however, the Boards rarely analyze or make available these data for workforce analyses. The Georgia Nursing Boards, however, aggregate and release some state-level data. Practitioner-to-population ratios were calculated using liscensure data, and, whenever possible, were compared to national or "ideal" rates and the rates established by the 1986 and 1991 studies of Georgia health professionals.

The primary approach to assess workforce demand was through a survey of Georgia's major health care institutions. Employment data were analyzed for vacancy rates and projected future employment and were compared to state and national rates when those were available. Historically, a majority of allied health care professionals have worked in health care institutions as opposed to individual practice; therefore, hospital vacancy rates as a measure of demand have consistently been used to examine the need for additional health care professionals. The movement to community-based and out-patient health care, however, has increased the presence of and need for health care workers in these and other newer health care settings. Consequently, the demand for professionals as expressed by hospitals is now only one indicator, and not always the leading indicator, of need for professionals in a particular area. The increase in diversity of employment settings emphasizes even more the need for a statewide data base that will provide data descriptive of health care professionals across a variety of settings.

Several institutions of higher education were consulted for data and information, since no single educational database summarizing graduates and enrollments in the health fields exists. Data were obtained from individual schools or programs, as well as the University System of Georgia Board of Regents and the Department of Technical and Adult Education. The Medical College of Georgia Office of Institutional Research compiles educational data for certain established allied health professions and was a valuable source for information and reference.

Most of the national professional associations collect and disseminate a limited amount of practitioner information. This information, however,

is usually aggregated at the national level and was of limited usefulness for state-level or within-state assessments. The U.S. Department of Health and Human Services, Bureau of Health Professions, compiles and publishes national-level data for selected occupations. Also, the U.S. Department of Labor Bureau of Labor Statistics (BLS), provides nationwide estimates of employment and projections of future employment, while the Georgia Department of Labor provides state estimates of current and projected employment.

Survey of Health Care Institutions

In winter 1995, a questionnaire was developed for collecting employment and vacancy data for selected health occupations in Georgia. The survey, completed in mid-1995, requested all hospitals, nursing homes, and home health agencies in Georgia to provide information regarding employment, vacancies, and projected growth in selected occupational categories.

The employment questionnaire asked for the current level of employment for specific occupations, the current number of vacancies, and projected future employment. The surveyed institutions also were asked to report occupations for which recruitment and/or retention were difficult. The respondents were asked about attrition and hiring times, but these data were incomplete and not analyzed. The survey also inquired about hiring policies for several occupations.

Out of 204 hospitals in the state, approximately 46 percent responded to the survey (Table 2). Thirty-six of the hospitals who returned the survey were located in urban areas; 57 hospitals served rural communities. The responding

Table 2
Survey Respondents, 1995

Facility	Respondents		Non-Respondents		Total
	no.	%	no.	%	no.
Hospitals	93	45.6	111	54.4	204
Nursing Homes	131	37.6	217	62.4	348
Home Health Care	41	44.6	51	55.4	92
Totals	265	41.1	379	58.9	644

hospitals accounted for 15,758 beds in the state, 49 percent of the total number of beds. Nursing homes replied at a slightly lower rate than hospitals, 38 percent. Forty-five percent of the home health care agencies responded to the survey. Appendices A-G provide a compilation of the data provided for each institutional sector.

Organization of the Report

This report begins with an overview of growth in Georgia's population based on U.S. Census data and gives an overview of the health care resources to serve that population. Following the demographics is an overview of physicians, their total number and practitioner-to-population ratios in the areas of family practice, general surgery, pediatrics, obstetrics/gynecology, and internal medicine. These data were provided by the State Board of Medical Examiners and the Joint Board of Family Practice. The analysis of supply and demand for physicians in this state is based largely on geographic distribution and the regional supply as compared to an "ideal number." This "ideal" standard, as established in 1981 by the Graduate Medical Education National Advisory Committee (GMENAC), has been called into question in recent years as changes in the provision of health care continue to escalate. To date, however, the standards or "ideals" have not been revised.

Following the discussion of physician supply and demand are sections on other primary care providers, such as nurse practitioners and physician assistants. Additional sections address nursing, the therapy professions, the diagnostic fields, and "other" allied health care professionals. The analyses for these professions depend heavily on vacancy data and demand as reported by health care institutions. The final section provides a summary of the findings and conclusions about the supply of and demand for health care professionals and services in Georgia.

Population and Health Care Resources

Population

Important to the consideration of the need for health care professionals is an examination of the demographics of a population. Total population count, distribution, age, and health status are some of the variables that may affect the demand for and type of health care professionals needed in an area. Health status of the population was not used in this assessment of workforce needs.

According to the 1990 U.S. Census, Georgia was the 11th largest state, with a total population of 6,478,216, gaining over 1 million people (18.6%) since 1980. By 1994, Georgia's total population had grown an additional 9 percent to 7,055,336. By 2010 the U.S. Census Bureau estimates Georgia's population will increase an additional 32 percent or more. Domestic inmigration accounts for much of the growth, with over 277,000 people moving to the state between 1990 and 1994; Georgia ranks second in the nation in the numbers from inmigration.

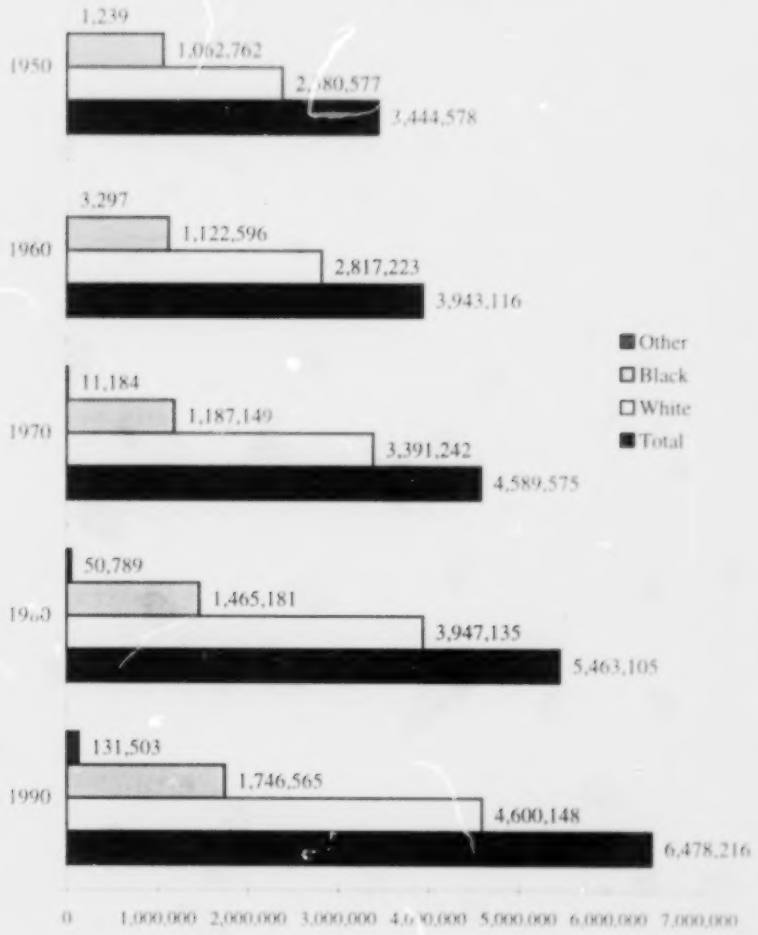
Georgia continued to become more racially and ethnically diverse in the past decade (Figure 1). Statewide, approximately 27 percent of Georgia's population is African-American, increasing 19 percent from 1980 to 1990. White population increased 16.5 percent between 1980 and 1990. The "other" category grew by over 80,000, reaching 2 percent of the total population.

Although Georgia is often thought of as a rural state, 68 percent of Georgia's population, over 4.6 million people, live in metropolitan statistical areas (MSAs). A metropolitan area is characterised by an urbanized area with at least 50,000 inhabitants that may also include outlying counties which have close economic and social relationships with the central counties. Eight MSAs, encompassing 42 counties, are located in Georgia: Albany, Athens, Atlanta, Augusta, Chattanooga, Columbus, Macon, and Savannah. The MSA counties have a slightly larger percentage of African-Americans than the 117 non-MSA counties. Interestingly, non-MSA counties grew by 15 percent between 1990 and 1994: a faster rate than the MSA counties and the state as a whole (U.S. Census Data, 1994).

Dependence

In planning for health care delivery and educational programs, it also is useful to examine the population's distribution by age. It is generally recognized that health care utilization forms a bimodal distribution with the greatest amount

FIGURE 1
TOTAL POPULATION OF GEORGIA BY RACE, 1950-1990



of care being consumed in the early years and latter stages of life. Preventive care and immunization of infants and children place different requirements on the health care system than treatment and sustaining care for older adults.

A useful way to examine population structure is through the calculation of age-related dependence ratios. Dependence ratios are calculated by comparing the number of dependents in a category per 100 contributors. Youth dependents are those under 18, while elder dependents are defined as being age 65 and above. Contributors are in the 18-64 age range.

U.S. Census figures from 1990 show that the total dependent population in the United States in 1990 numbered 62 per 100 "potential contributors." In 1990 there were 62 people either 65 and above or under 18 for every 100 people between 18 and 64 (Table 3). Of the total dependents, 41 were youth dependents (under 18) and 20 were elder dependents (age 65 and above) (Morris, 1994). It should be noted, however, that dependence is likely higher than the ratio indicates because every contributor as defined by age may not be a contributor. Some persons will be disabled, unemployed or unemployable, or otherwise dependent.

As shown in Table 3, youth dependence makes the larger contribution to total dependence in the U.S. and in Georgia. Nationwide, there are 41 youth dependents per 100 contributors and in Georgia, 42. Georgia's elder dependence ratio at 16 is slightly lower than the U.S. rate of 20.

TABLE 3

REGIONAL, STATE AND NATIONAL DEPENDENCE RATIOS, 1990

	Total*			White			Black		
	Youth	Elder	Total	Youth	Elder	Total	Youth	Elder	Total
Georgia	42	16	58	37	17	54	56	13	69
U.S.	41	20	62	38	22	61	54	14	68

Source: U.S. Census Data, 1990.

*Dependence ratios are calculated by comparing the number of dependents in a category per 100 contributors. Youth dependents are under age 18, elder age 65 and above. Dependence numbers may not total due to rounding.

An examination of dependence by race shows that total dependence nationwide is higher for blacks than whites, and this difference may be at observed in Georgia at the state level (Table 3). White total dependence at 54 per 100 is much lower than total dependence in the black population at 69 per 100.

The higher level of total dependence in the black population is driven by higher youth dependence. Black youth dependence in Georgia at 56 per 100 contributors accounts for almost all of black dependence; black elder dependence in Georgia is a low 13 per 100 contributors. This is similar to black elder dependence nationally at 14.

The white population in Georgia and the nation has a much lower youth dependence ratio at 37 and 38 per 100 contributors, respectively. The elder white ratio in Georgia is 17 elder per 100 contributors, higher than Georgia's black elder population, but lower than the nation as a whole.

Certainly, age-related data have implications for the type and supply of health care professionals and services needed by a population. These data are presented here for the broad context they provide in considering the supply of and demand for health care professionals in Georgia. Their greater usefulness, however, is in their contributions to regional or county-level planning where specific health care needs and issues of delivery must be addressed. For example, a high number and ratio of youth dependents will suggest the need for certain types of professionals and services, while a high number of elder dependents will suggest a different set of needs and services in a specific region or county. Traditionally, the need for pediatricians, obstetricians, and other primary care professionals was established based on the characteristics of a population. The connection between population demographics and health status and the need for other health care professionals has been less clear. As the discussions of adequate professional mix evolve, the importance of dependence ratios and other health status variables for issues of access and services need to be more completely explored.

Health Care Institutions

Geographical location also influences the availability of health care workers and services. In 1995, 204 general and specialty hospitals were located in Georgia, with a total of 29,206 beds; that is, one hospital bed for every 292

people in the state. Since 1986, seven hospitals have closed, decreasing the number of available beds by 14.4 percent. Nationally, the number of hospitals has decreased 9.2 percent in the past decade, with an 11.3 percent reduction in the number of available beds (American Hospital Association, 1996).

Rural hospitals seem to be hit the hardest by the reductions. In 1986, 112 hospitals were located in non-MSA Georgia counties, with 12,040 beds set-up. In 1995, the 104 rural or non-MSA hospitals reported 9,670 set-up beds (Table 4). Since 1986, the number of MSA county hospitals has increased by one (n=100), but the number of beds have decreased 11.6 percent, from 22,088 to 19,536. The decline in beds and hospitals reflects changes in the health care delivery system and the existing movement to outpatient and community-based services. The changes have also affected employment patterns and demand for health care workers among the various professions.

Nursing homes are well distributed across the state. The number of nursing homes in Georgia has decreased slightly since 1991, although the number of beds has continued to increase. In 1991, 351 nursing homes were registered, with 35,453 bed capacity. In 1995, 349 nursing homes with 37,935 beds were located in Georgia, increasing the number of beds available by more than 7 percent. Forty-seven percent of nursing homes (n=167) are located in MSA counties with 54 percent of the beds (n= 20,407).

The numbers of home health care agencies increased rapidly between 1991 and 1995. In 1991, 75 home health care agencies served the state. By 1995 the number had risen to 91, a 23 percent increase.

TABLE 4
HOSPITAL BY AREA AND SET-UP BEDS, 1995

	Respondents		Non-Respondents		Total	
	no.	beds	no.	beds	no.	beds
Urban	37	7,762	63	11,774	100	19,536
Rural	56	6,475	48	3,195	104	9,670
Total	93	14,237	111	14,969	204	29,206

Education

The supply and distribution of health professionals are related to many factors: current level of professional services and health care institutions, cultural and social contexts, economic conditions, and educational opportunities, to name a few. A major factor influencing the supply of professionals is the presence and productivity of educational programs in a state or region. The active supply of professionals over time will be affected by the number of enrollments and graduations annually in specific programs both at the national and state levels. Programs that are inaccessible for geographic or financial reasons may produce fewer graduates for a specific locale than programs that are accessible and well distributed. Other factors such as the provision of financial aid and academic support services may affect enrollments and graduation rates.

Although educational programs located within a region historically have provided more health professionals for an area than programs located at some distance, this pattern may change in future years as distance education is rapidly expanding the boundaries of programs from the traditional classroom to sites across the state and beyond. In fact, Georgia's interactive video technology is titled *Georgia System for Academic and Medical Support* (GSAMS). As the name suggests, health care delivery and instruction are key in utilization of the system. Georgia's accredited health care education programs are listed by profession throughout this report.

Terminology

Several terms are used throughout this report that need to be defined. These terms appear as the *italicized* words in this section. The county was selected as the unit of analysis for many of the occupations, particularly those for which county-level licensure data are available. Appendix H provides a breakdown by county of this information. *Supply* refers to the number of practitioners eligible to perform a particular service, or practice, within a specific health care occupation. The *active supply* is the number of active practitioners in a profession, and this term seeks to exclude practitioners who are "inactive" due to retirement, unemployment, and so forth. Supply may be expressed as a numerical headcount or as a full-time equivalent (i.e., fte, where a part-time worker is expressed as a proportion of a full-time worker).

Demand refers to the number of workers whom employers are willing to employ or consumers are willing to reimburse for their services. Demand may be expressed as a *vacancy rate* (i.e., the number of unfilled positions expressed as a percentage of total positions) in hospitals, nursing homes, or health care settings. *Need* defines the number of workers needed to satisfy defined health needs in a geographic area or in a designated population. Need may exceed demand because demand is often intertwined with economic conditions, e.g., insurance coverage. Demand/need also may be expressed as a ratio or rate when comparisons of supply vis-á-vis population are examined against established ideals or norms. Thus, *practitioner-to-population data* also address supply and demand.

The *health care rate* is the number of health care professionals per 100,000 population. The rate is calculated by dividing the number of professionals by the designated population area and multiplying by 100,000. The *health care ratio* is the population per one professional and is calculated by dividing the population by the number of practitioners. Throughout the text, regional and state rates of practitioners-to-population are compared to national standards or norms for examining adequacy of supply. Appendix H provides a break down of the practitioner-to-population rates for selected health professions by county in Georgia. In the case of medical doctors, the Graduate Medical Education National Advisory Committee (GMENAC) study of physician supply and demand was consulted for the suggested "ideal" rates (U.S. Department of Health and Human Services [DHHS], 1981). For allied health, comparisons were made between the Georgia rates and the national rates of practitioners-to-population.

Physicians

Traditionally, the supply and distribution of medical doctors have been key to issues of access and availability of health care services. And, as the nucleus of health care teams, their presence greatly affects the supply of and demand for *other* health care professionals. Currently, nurse practitioners, physicians assistants, and other allied health professionals are assuming larger roles in the provision of primary care and prevention; and concomitant with other changes in the organization of health care services, the role of physicians is also changing. At this time, the end results of these changes are uncertain; and the professional mix that will predominate in the future is unclear. It is apparent, however, that the emphasis on primary care, preventive care, and cost control are among the leading goals in the restructuring of health care. In medical education, these trends may be observed in an increase in programs to train generalists and shifts in funding away from the training of more subspecialists.

This section will provide an overview of physician supply and distribution in Georgia. These data were provided by the Joint Board of Family Practice, State of Georgia. The demand for physicians was calculated using the standards recommended by the 1981 Graduate Medical Education National Advisory Committee's (GMENAC) study of physician supply and demand. Although critics assert that the GMENAC "recommended standards" for practitioner-to-population ratios are dated and flawed for use in the current health care environment, revised standards have not been developed. And, the GMENAC standards continue to be useful not for establishing "absolute" demand, but in allowing for regional and state comparisons.

When examining the distribution and requirements for physicians and other health care workers, it is important to remember that *demand* and *need* for health care are not synonymous. The young and elderly may have high needs for checkups and treatment; however, they may lack access for financial or other reasons. With limited access, either geographically or economically, preventive care may be deferred and other types of treatments delayed. Thus, the expressed demand may be quite low. In the absence of medical doctors and other health care professionals, health care needs may go unmet, demand for health care services may be sharply reduced, and "need" will not be expressed as "demand."

Thus, the following section will compare the licensed supply of physicians against a recommended standard that serves as a rough proxy for need and demand.

Medical Doctors: U.S. Supply

Although the number and rates of physicians vis-á-vis the population have grown dramatically since the 1950s, Georgia's total physician population remains lower than the national average and below the recommended "ideal" ratios established by GMENAC. In 1980 the U.S. physician-to-population rate was 185 per 100,000 population. Georgia in that year was much lower at 143 per 100,000 (Morris, 1989). By 1994 the growth in U.S. physician supply continued to outpace Georgia's growth and the physician-to-population ratio nationally stood at 270 per population as compared to Georgia at 182 physicians per 100,000 population (Joint Board of Family Practice, State of Georgia [Joint Board], 1994). Nationally, the southeastern states are among the lowest in physician-to-practitioner rates, and, in Georgia, rural health care experiences shortages while many urban areas meet or exceed the GMENAC recommended "ideal" rates.

Medical Doctors: Georgia Supply

In 1994 a total of 12,709 physicians practiced in Georgia, an increase of 2,373 from 1990 when 10,336 were active. During this time period, Georgia's physician-to population rate increased from 156 to 182 per 100,000 population; however, this rate is still below the U.S. rate of active nonfederal physicians and the GMENAC recommended rate of 191 per 100,000 (Joint Board, 1994).

The numerical and rate increase of Georgia's physicians during the early 1990s did little to erase the discrepancies in supply between urban and rural Georgia. In 1994 the physician-to-population rate for urban Georgia was 218 as compared to 108 in rural Georgia. The 1990 rates were similar at 193 urban and 91 rural. While Georgia's supply of urban physicians reaches the GMENAC "ideal" rate, the rural areas are 44 percent below the standard.

Based on data released from the Joint Board of Family Practice, Georgia continues to rank in the bottom half of the states in practitioner-to-population ratios, and large discrepancies in physician supply continue to exist between the

rural and urban areas of the state. To reach the GMENAC standard of 191 physicians per 100,000 population by the year 2000, an additional 1,983 medical doctors would need to be added to Georgia's current supply.

Primary Care

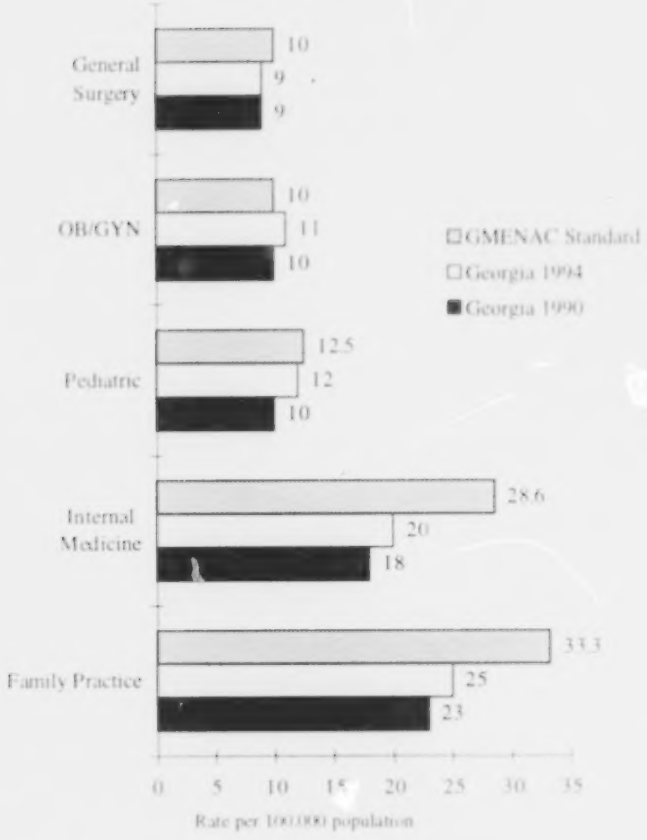
Physicians practicing internal medicine, pediatrics, general surgery, family practice, and obstetrics/gynecology are considered primary care physicians. When Georgia's physician distribution is examined by primary care specialty, the rates per population remained virtually unchanged between 1986 and 1994 (Figure 2). The major exception was internal medicine: between 1986 and 1994 the number of practicing internists statewide fell by 7.8 percent. The urban areas experienced the bulk of this decline. In 1995, there were 20 internists per 100,000 population and the urban rate at 24 was still double the Georgia rural rate of 12 for this specialty. The GMENAC standard for internal medicine is 28.6 per 100,000 population. The decline in physicians who practice internal medicine is related to both retirements and specialty selections of new entrants into the field. In 1994 a total of 1,399 internal medicine physicians practiced in Georgia, a decline of 118 over the years 1986 to 1994.

In 1994, a total of 820 pediatricians practiced in Georgia, a rate of 12 per 100,000 population. With the addition of 213 pediatricians between 1986 and 1994, the state came close to the recommended "ideal" ratio of 12.5 per 100,000. The statewide supply, however, masks the underlying large difference between rural and urban supply. At 15 pediatricians per 100,000 population the urban rate is more than twice the rural rate of 6 per 100,000.

Family practice is aimed at children through the elderly, and educational programs are increasingly aimed at developing practitioners to serve in rural areas. In 1994, there were 1,744 family/general practice physicians in Georgia, 25 per 100,000 population. This number and rate reflects an increase from 1990 when the rate was at 23 (Figure 2). Family practice is the only primary care field in Georgia in which the rural rate of practitioners surpasses the urban rate at 30 as compared to 23 per 100,000 population. Both of these rates, however, are below the GMENAC recommended standard of 33.3 per 100,000 population.

In 1994, a total of 647 general surgeons practiced in Georgia, an increase of 81 between 1986 and 1994. The rate of 9 per 100,000 was unchanged from 1990

FIGURE 2
RATES OF SPECIALTY PHYSICIANS,
GEORGIA and GMENAC STANDARD,
1990 and 1994



and close to the 10 per 100,000 recommended by GMENAC (Figure 2). The rural and urban distribution varied only slightly at 8 and 10, respectively, per 100,000 population.

In 1994 a total of 810 physicians practiced obstetrics and/or gynecology in Georgia, an increase of 35 percent between 1986 and 1994. At 11 per 100,000 population, the ob/gyn rate statewide slightly exceeds the GMENAC standard of 10 per 100,000. The need for ob/gyn practitioners in rural areas, however, is revealed in the discrepancy between the rural rate at 6 per 100,000 and the urban rate at 14 practitioners per 100,000 population. The need for higher levels of obstetrical care is illustrated by Georgia's high infant mortality rate at 12.5 per 1,000 live births (Bachtel and Boatwright, 1995).

Between 1986 and 1994, the rate of subspecialty physicians (e.g., orthopaedic surgery, plastic surgery) per population in Georgia rose from 68 to 105 per 100,000. In 1994, subspecialists comprised 58 percent of the total physician population in Georgia. Urban subspecialists numbered 132 per 100,000 as compared to a rural subspecialists at 47 per 100,000. Because subspecialists rely on advanced technology often found only in large urban tertiary centers, these specialists will continue to practice in greater proportions in urban areas of the state.

Conclusions

The supply of primary care physicians in Georgia has increased since 1986, and in 1994 is in close approximation to the GMENAC standard in general surgery, ob/gyn, and pediatrics. Internal medicine and family practice, as shown in Figure 2, continue to fall below the GMENAC standard. Distribution of physicians continues to be the area of greatest concern: in the areas of ob/gyn, pediatrics, and internal medicine, the rural rate of practitioners is less than half the urban rate, with pregnant women and children being the groups most affected by limited access to these primary care professionals. Attention needs to be directed at establishing how many of the ob/gyn practitioners practice both obstetrics and gynecology, and if family practice physicians are providing this service in some rural (and other) areas of the state. With the growing emphasis nationwide on preventive care and primary care practice, it is likely that in the next decade physicians trained in these areas will continue to increase.

Although it is generally accepted that population size is related to physician distribution, other factors such as physician attitude, financial reward structure, and infrastructure development will influence the practice location. Physician distribution only partially reflects community need; it also reflects physician need. Because general practitioners deliver nonspecialized services, they do not require a "market" as large as specialists (Zsembik, 1985). Specialists are offering specific, less general, services to a potentially select clientele; consequently, specialists generally require a larger market. Accordingly, specialists and general practitioners will be differentially distributed across geographic areas (Zsembik, 1985). Thus, it would be expected that primary care physicians would be better distributed across the region than subspecialists and physicians overall.

Emerging changes in health care, however, and the increasing emphasis on primary care may change the recommended rates of physicians-to-population and the composition of those providing these services. Current conditions show that in social and health planning, we are better at describing the past than predicting future outcomes of policies and programs. Thus, predicting the future composition of the health care workforce and needs of the population for various types of professionals in this rapidly changing environment is difficult.

Physician Assistants

Physician assistants (PAs) work in cooperation with physicians and other health professionals to provide patient services ranging from primary care to specialized surgical assistance. In Georgia, PAs perform their duties based on guidelines established by supervising physicians, and their job descriptions must be approved by the State Board of Medical Examiners before state certification is granted. In 38 states PAs may also write prescriptions (AAPA, 1995); but the Georgia code does not permit this practice. To practice in Georgia, PAs must successfully pass the National Certifying Examination.

The national supply of physician assistants is generated by 59 accredited physician assistant educational programs (AAPA, 1995). Two programs are offered in Georgia: the Medical College of Georgia (MCG), which graduates approximately 25 students per year, and Emory University, which has averaged 40 graduates annually over the past five years (MCG factbook, 1995; Emory, personal communication, 1995). The growing emphasis on primary care nationally and in Georgia is reflected in the recent increase of graduates from Georgia's two educational programs (Table 5).

The Bureau of Labor Statistics estimates that 56,000 physician assistants (21.5 per 100,000 population) were in the labor force in 1994 (Table 6). The American Academy of Physician Assistants estimates a much lower workforce of just over 30,000 physician assistants (AAPA, 1995). In 1995 the Georgia Board of Medical Examiners recognized 1,147 PAs in active practice in

Table 5
Physician Assistant Educational Programs, 1995
Georgia

	1990	1991	1992	1993	1994	1995
Emory	21	32	34	38	49	49
MCG	25	24	20	28	23	32
Totals	46	56	54	66	72	81

Sources: Emory, 1995; MCG Fact Book, 1995.

Georgia, 16.3 per 100,000 population (Georgia Secretary of State, State Examining Boards [SEB], 1995). Nationwide and in Georgia the number of professionals in this field has increased significantly since the early 1980s, when just over 17,500 were identified nationally and 610 were located in Georgia.

According to the American Academy of Physician Assistants, approximately 28 percent of PAs are hospital-based; 27 percent are in group practice; and only 6 percent work in rural clinics (AAPA, 1995). The Georgia Department of Labor estimates that only 10 percent of Georgia PAs work in the hospital setting. Consequently, practitioner-to-population ratios are more useful for examining the supply and demand for this professional across geographic areas than hospital vacancies. An examination of the location of Georgia's PA workforce using addresses provided by the Georgia Board shows that twice as many PAs are located in Georgia's MSA as non-MSA counties; that is, 19.5 PAs per 100,000 population in the metro areas as compared to 9.4 per 100,000 in nonmetro counties.

Based on the AAPA annual membership census, the average age is 40; 56 percent are male; and 57 percent practice in primary care. The AAPA estimates that one-fifth work in towns of 10,000 or less, and 34 percent of all PAs practice in towns of less than 50,000 (AAPA, 1995). The Georgia State Office of Rural Health and Georgia Southern University's Center for Rural Health (1995), in a survey found that slightly over one-third of Georgia PAs work with physicians in private practice settings and one-third work in community hospitals, based on 464 PAs respondents. Approximately 82 percent in this survey worked in urban counties.

This profession is projected to experience moderate growth over the next ten years. The Bureau of Labor Statistics projects that 13,000 additional practitioners will be added between 1994 and 2005, a 23 percent increase in employment (Table 6). The Georgia Department of Labor projects the addition of approximately 200 PAs in Georgia between 1995 and 2005, a 15 percent growth rate. Further, the department estimates 40 annual job openings, 20 from net growth and 20 for replacement. This estimate of openings is less than the number of graduates annually from Georgia's two programs; a 1990 Georgia study found that the state has 7 to 8 job openings for every new physician assistant graduate (Zwemer, 1990), and a later national study reported 7 positions for every new graduate (Willis, 1993). Georgia's increase in educational productivity should satisfy some of this demand.

TABLE 6
EMPLOYMENT BY OCCUPATION, 1994-2005
(USING MODERATE PROJECTIONS FOR 2005 EMPLOYMENT FIGURES)

Occupation	Employment		Numerical Change	Percent Change
	1994	2005		
Physician Assistants	56,000	69,000	13,000	23
Registered Nurses	1,906,000	2,379,000	473,000	25
Licensed Practical Nurses	702,000	899,000	197,000	28
Physical Therapists	102,000	183,000	81,000	79
Physical & Corrective Therapy Assistants & Aides	78,000	142,000	64,000	82
Respiratory Therapists	73,000	99,000	26,000	36
Occupational Therapists	54,000	93,000	39,000	72
Occupational Therapy Assistants & Aides	16,000	29,000	13,000	81
Radiologic Technologists & Technicians	167,000	226,000	59,000	35
Nuclear Medicine Technologists	13,000	16,000	3,000	23
Clinical Lab Technologists & Technicians	274,000	307,000	33,000	12
Medical Records Technicians	81,000	126,000	45,000	56
Medical Assistants	206,000	327,000	121,000	59
Surgical Technologists	46,000	65,000	19,000	41
Dietitians & Nutritionists	53,000	63,000	10,000	19
Social Workers	557,000	744,000	187,000	34

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review* November 1995.

Summary

In summary, the rate of PA practitioners to population is lower in Georgia than the nation; yet, dramatic gains in the overall number of PAs statewide have taken place since the early 1980s and recently the state's two educational programs have increased the number of graduates. Currently, however, by all estimates fewer PAs are available to rural populations. The lower ratio of PAs to practice in rural areas is of special concern as many of Georgia's rural areas also have many fewer primary care physicians per population. Salary requirements may be a factor in this situation. Entry-level salaries average over $46,000 and experienced physician assistants average $55,000 to $60,000; consequently, the employment of a physician assistant in a private practice office may be beyond the reach of a single practitioner serving in an economy with limited resources.

Other factors affecting the distribution of PAs is the reported statewide undersupply and current practice opportunities in various geographical areas. The future supply of and demand for PAs also will increasingly be affected by managed care networks as they attempt various professional workforce compositions to control cost and manage care. Across the nation and in Georgia, the demand for this professional will likely continue to increase.

Registered Nurses

Nurses form the largest group of health professionals nationwide and in Georgia (Table 6). As of July 1995, 61,133 current RN licenses were in effect in Georgia, including "active RNs," plus out-of-state nurses who are licensed in Georgia, and those currently not working in the field (Georgia Board of Nursing, 1995). An estimated 43,000 lived and worked in Georgia, and approximately 35,000 worked full-time. Over the period 1995-2000, *active RNs* in Georgia are projected to increase to 50,000, a 28 percent increase (GDOL, 1995). This growth is in line with that projected nationally (Table 6).

In 1995 the rate of active RNs per 100,000 population nationwide was 755 as compared to Georgia's 673 based on calculations by the Division of Nursing, Bureau of Health Professions (U. S. Department of Health and Human Services [DHHS], 1995). The Georgia Department of Labor (1995) estimated 39,000 active RNs in Georgia in 1995, yielding a rate of 553 per 100,000 population, considerably lower than the rate reported by the Bureau of Health Professions. According to the Georgia Department of Labor, the Atlanta region claims almost one-half of the state's active RNs. The most recent county-level analysis of the registered nursing population in Georgia was in 1988. In 1992, Georgia ranked 38th among the states in RNs per population, and Mississippi ranked 50th (Morgan et al., 1995).

Ten percent of all Georgia licensees are black; 90 percent are female; and one-quarter are baccalaureate degree RNs. Nationally, only 4 percent of RNs are African-American (Moses, 1992). Nationwide, nearly two-thirds of employed RNs work in hospitals and approximately 70 percent of the eligible workforce are employed full-time (Moses, 1992). Nationally, a smaller percentage work in nursing homes (7%), community/public health (10%), ambulatory care (8%), and other areas (7%) (Moses, 1992). The Georgia Board of Nursing (1995) reports that approximately 55 percent of Georgia's nurses work in the hospital setting; consequently, the hospital sector is a reliable indicator of the demand for nurses in this state.

In Georgia, there are 20 associate degree (AD) educational programs, 14 generic baccalaureate (BS) programs, 5 RN/BSN programs, and 10 masters degree programs (Table 7). According to the Georgia Nursing Board, several associate degree programs are planning to phase out the AD degree and convert to a baccalaureate degree (BS) program.

TABLE 7
NURSING EDUCATIONAL PROGRAMS IN GEORGIA

Associate Degree

Abraham Baldwin Agricultural College (Satellite: Valdosta)
Armstrong State College
Athens Area Technical Institute
Augusta College
Brunswick College
Clayton State College
Columbus College
Dalton College
Darton College (Satellite: Thomasville)
DeKalb College
Floyd College (Satellite: Cartersville)
Georgia Southwestern College
Gordon College
Kennesaw State College
La Grange College
Macon College
Middle Georgia College (Satellite: Dublin)
North Georgia College (Satellite: Atlanta; Gainesville)
South Georgia College (Satellite: Waycross)
West Georgia College (Satellite: Dalton; Rome)

BSN and RN/BSN

Albany State College
Armstrong State College
Brenau University
Clayton State College (BSN and RN/BSN)
Columbus College
Emory University
Georgia Baptist College of Nursing
Georgia College (Satellite: Dublin; Macon)
Georgia State University
Georgia Southern University
Georgia Southwestern College
Kennesaw State College
La Grange College
Medical College of Georgia (Satellite: Athens)
North Georgia College (Satellite: Atlanta; Gainesville)
Thomas College
Valdosta State University
West Georgia College (Satellite: Dalton; Rome)

TABLE 7 (*continued*)
NURSING PROGRAMS IN GEORGIA

Masters

Albany State College
Armstrong State College
Brenau University
Emory University
Georgia College (Satellite: Dublin; Macon)
Georgia State University
Georgia Southern University
Kennesaw State College
Medical College of Georgia (Satellite: Athens)
Valdosta State University

Doctoral

Georgia State University
Medical College of Georgia

Nursing Specialties

Nurse Practitioner

Albany State College
Brenau University
Emory University
Georgia College
Georgia Southern University
Georgia State University
Kennesaw State College
Medical College of Georgia
Valdosta State University

Nurse Midwife

Emory University

Source: Georgia Board of Nursing Program Directory, 1996.

Approximately 2,500 students graduate annually from all professional nursing programs in Georgia, up from 1,800 in the early 1990s (GOICC, 1995). The increase in number of graduates may be a factor in the current easing of stress between supply and demand; earlier statewide studies noted a serious imbalance (Morris, 1987; Morris, 1992).

RNs made up one to the largest health care professional groups employed by the surveyed institutions. In 1995 the responding hospitals reported 10,219 current fte nursing positions, with 572 fte budgeted vacancies (Table 8). Nursing homes reported 560 fte RNs in their institutions, with 47 budgeted fte vacancies. A total of 1,577 RNs were employed by responding home health care agencies, posting 92 budgeted vacancies.

A 1990 study by the Georgia Hospital Association (GHA) and the American Hospital Association (AHA) found a RN vacancy rate of 15.9 percent in Georgia

TABLE 8
NURSING EMPLOYMENT IN GEORGIA, 1995

Occupational Category	Current Personnel FTE*	Budgeted Vacancies FTE*	Total FTE*	Vacancy Rate (%)
Registered Nurses				
Hospital	10,219	572	10,791	5.3
Nursing Home	560	47	607	7.7
Home Health Care	1,577	92	1,668	5.5
Nurse Practitioner				
Hospital	44	23	67	34.3
Nursing Home	22	1	23	4.3
Nurse Midwife				
Hospital	37	1	38	2.7
Nurse Anesthetist				
Hospital	55	7	62	11.6
Licensed Practical Nurses				
Hospital	3,247	219	3,466	6.3
Nursing Home	1,861	88	1,949	4.5
Home Health Care	392	23	415	5.4

* All FTE are rounded to the nearest whole number.

TABLE 9
VACANCY RATES, GEORGIA HOSPITALS, 1986, 1991, AND 1995
NURSING PERSONNEL

Occupational Category	1986	1991	1995
RN	9.4%	12.5%	5.3%
Nurse Practitioner	4.5%	12.4%	34.3%
Nurse Anesthetist	5.1%	12.6%	11.6%
Nurse Midwife	**	10.0%	2.7%
Practical Nurse (LPN)	4.2%	8.6%	6.3%

Note: The vacancy rates are for all hospitals responding in each year. (1986 = 116; 1991=104; 1995= 93).
** = Not measured in this survey.

and 11 percent in the United States (GHA, 1991). This survey of hospitals (1995) found that RN vacancy rates had decreased dramatically, falling to 5.3 percent across Georgia, a drop from the 1991 survey, which reported a 12.5 percent vacancy rate, and the 1986 survey, which reported a 9.4 percent rate (Table 9). Similarly, the RN vacancy rate at 7.7 percent in nursing homes and 5.5 percent in home health care were lower than in the two previous studies. Of equal importance, the hospital respondents in this recent study did not project any growth in RN employment until the year 2000 (Appendix B). Home health respondents projected moderate growth at 6 percent, and nursing homes projected an increase in employment of RNs (19%). Nursing homes have traditionally reported difficulties in attracting and retaining registered nurses, and the vacancies and projected growth in this sector continue to reflect this difficulty.

Advanced Practice Nursing

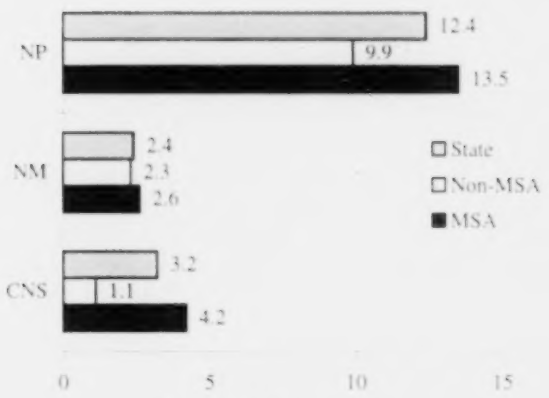
Four categories of advanced practice nurses are discussed in this study: nurse practitioners, clinical nurse specialists, nurse midwives and nurse anesthetists. In a 1992 survey of registered nurses, approximately 140,000 RNs nationwide reported credentials and education that allowed advanced practice (Moses, 1992). The 1995 Georgia licensure renewal survey documented 2,547 RNs in advanced practice (GBN, 1995).

Nurse Practitioners

Nurse practitioners are nurses who have acquired advanced education in physical examinations and health care. They diagnose and assess patient conditions and work in collaboration with physicians. In some states, though not Georgia, they prescribe medications. NPs deliver primary care in inpatient and community settings, either under physicians or in their own independent practices. Many NPs practice in rural and underserved areas (Figure 3).

Nine institutions in Georgia offer programs that award master's degrees and post-master's degree certificates for nurse practitioners (Table 7). In 1990, only

FIGURE 3
RATES OF ADVANCED NURSING PERSONNEL IN GEORGIA RURAL AND URBAN AREAS, 1995



Georgia State and Emory offered nurse practitioner programs. In addition to RN licensure, certification also is required by the Georgia Nursing Board for all areas of advanced practice. Nationwide, only about 58 percent of NPs are certified by national boards.

Approximately 49,500 nurses nationwide are classified as nurse practitioners (NP), having received advanced education that resulted in a certificate or master's degree; 23,659 have position titles of nurse practitioner (Moses, 1992). The most recent Georgia RN Renewal survey (1995) reported 912 RNs with nurse practitioner status. An analysis of nurse practitioner licensure data revealed 872 (12.4 per 100,000) in the state, up from 530 (8.2 per 100,000) in 1990 (Morris, 1992). The actual number of active practitioners in this profession statewide is unknown. Based on place of residence from the Georgia licensure data, 9.9 NPs per 100,000 population live in nonmetropolitan counties and 13.5 live in metro counties across Georgia (Figure 3).

According to the Bureau of Health Professions, nationally 75 percent of nurse practitioners work in outpatient or ambulatory care settings. About 13 percent work in hospital inpatient units. Nearly 18 percent of nurse practitioners worked in nonmetropolitan areas nationally (Moses, 1992). An assessment of licensure data show that one-quarter of Georgia's NPs live in nonmetropolitan counties; however, relative to the nonmetropolitan population, the rural rate of practitioners-to-population is 75 percent of the urban rate (Figure 3).

A survey by the Georgia State Office of Rural Health and Georgia Southern University's Center for Rural Health (1995) found that of the NP respondents, an estimated one-quarter work in public health, and 70 percent of Georgia NPs work in urban counties. A total of 578 NPs responded to the survey, a rate of 13 per 100,000 population. According to the Georgia Board of Public Health, 151 NPs work in public health (Georgia Board of Public Health, 1995). The public health sector reports difficulty in attracting and retaining NPs due to the salary opportunities in other settings.

Nurse practitioners are in high demand in Georgia's hospitals sector (Table 8). Hospitals reported 44 fte current personnel, with 23 budgeted vacancies (34% vacancy rate) (Table 8). Forty-eight percent of the vacant NP positions were reported in metropolitan hospitals. In the past 10 years, the hospital vacancy rate for nurse practitioners has risen dramatically, from 4.5 percent in 1986 to 12.4 percent in 1991 to 34 percent in 1995, one of the highest vacancy

rates of the professions surveyed (Table 9). This is in contrast to the decline in vacancy rates for other nursing personnel.

Projected growth until 2000 is also strong for NPs: the hospital respondents project the addition of 41 positions (61% growth) and the nursing home respondents project an additional 12 positions (52% growth). Vacancies and growth in the these two settings will require 150-200 additional NPs until the year 2000. Recognizing that these settings claim an estimated one-quarter of the nurse practitioner population, additional demand from community settings likely will drive the demand for additional NPs even higher.

Clinical Nurse Specialists

Clinical nurse specialists are advanced practice nurses who function in an area of nursing specialization. Areas of specialization include community health, neonatology, cardiovascular care, oncology, surgery, geriatrics, pediatrics, and mental health. As nursing and other health fields are becoming more complex, the demand for clinical nurse specialists is growing.

According to the American Nurses Association, a clinical nurse specialist "must earn a master's degree in nursing that confers specialized knowledge, skills, and training to the RN" (Moses, 1992). Approximately 100 students graduate yearly from University System of Georgia (USGA) institutions with master's degrees in nursing (USGA, 1995).

Nationwide, just over 58,000 RNs are clinical nurse specialists (CNS). In a recent licensure renewal survey, 357 Georgia RNs self-reported certified nursing specialties (GBN, RN Renewal Survey, 1995). A list of certified nurse specialists from the Georgia Board shows only 255 as licensed in Georgia; 228 reside in Georgia (3.2 per 100,000). Based on the place of residence from the Georgia licensure data, 1.1 CNS per 100,000 population live in nonmetropolitan counties, and 4.2 live in metro counties across Georgia (Figure 3). These professionals were not included in the survey sent to Georgia hospitals.

Nurse Midwives

Nurse midwives provide care for normal, healthy women before, during and after childbirth. They assist in labor and delivery, help with newborn care, and counsel mothers on infant growth and future pregnancies. Nurse midwives offer accessible birth care in many underserved rural and inner-city areas.

Education for advanced practice generally occurs at the master's level. Nationwide, there are 46 accredited nurse-midwifery education programs in the United States, up from 25 in 1990 (American College of Nurse-Midwives [ACNM], 1995). Nurse midwives complete programs lasting nine months or more beyond their basic nursing preparation. Approximately 73 percent of CNMs have a master's degree; 4 percent have doctoral degrees. Each year approximately 400 nurse-midwives pass the national certification exam. The number of nurse-midwives who are certified each year has increased by 25 percent since 1991 (ACNM, 1995).

Emory University offers the only accredited NM educational program in Georgia. Sixteen students were admitted to the program for 1996-97. Ninety students have graduated since 1976 (Emory, personal communication 1996).

Nurse midwives (CNM) form the smallest group of advanced practice nurses; only slightly more than 7,200 RNs nationwide were nurse-midwives in 1992 (Moses, 1992). The 1995 RN renewal survey reported 196 CNMs in Georgia (GBN, 1995). A review of the licensure data identified 189; 161 lived in Georgia (SEB, 1995). The nurse midwife to population rate in Georgia was 2.3 per 100,000. Based on the place of residence from the Georgia licensure data, 2.3 NMs per 100,000 population live in nonmetropolitan counties, and 2.6 live in metro counties across Georgia (Figure 3). The recent increase in students reflects a growing interest in and acceptance of this profession.

Nurse midwives typically practice in birthing centers, hospitals, and private settings, such as well-woman care. Nationwide, 40 percent work in the hospital setting (ACNM, 1995). Eighty percent of nurse-midwives who deliver babies do so in hospitals (Moses, 1992). Georgia hospital respondents reported 37 fte nurse midwives currently employed, with one vacancy (Table 8). The vacancy rate has dropped from 10 percent in 1991 to 2.7 percent in 1995 (Table 9). Nationally, 34 percent of the women cared for by nurse-midwives live in inner city areas; 22 percent in rural areas (Moses, 1992). According to this study, 31 out of the 37 nurse-midwives were employed by hospitals in rural counties.

A survey by the Georgia State Office of Rural Health and Georgia Southern University's Center for Rural Health (1995) found that of the CNM respondents, approximately 45 percent work in private practice settings with physicians, and 71 percent work in urban counties. A total of 76 CNMs replied to the survey.

Georgia hospitals projected a 29 percent increase in the number of nurse midwife positions by 2000. Extrapolating from this data, 3 or more nurse midwives will be needed each year to keep up with new openings and separations. It seems that a coordinated intervenient approach combining obstetrical and midwifery care could greatly extend obstetrical services and reduce infant mortality among disadvantaged populations.

Nurse Anesthetists

The oldest of the advanced practice fields, nurse anesthetists blend nursing skills with the practice of anesthesia. More than 65 percent of the anesthetics given in the U.S. are administered by nurse anesthetists; they are the sole providers of anesthesia for 85 percent of rural hospitals (Waugaman and Foster, 1995). The average annual earnings for nurse anesthetists is $76,000, more than $30,000 higher than any other advanced practice area.

In 1995, 94 nurse anesthetist programs were accredited by the Council on Accreditation of Nurse Anesthetist Educational Programs; the majority were master's level programs (Waugaman and Foster, 1995). By 1998, all educational programs will be required to offer a master's degree (Waugaman and Foster, 1995). Nurse anesthetists complete two-year programs beyond their basic nursing education program. Most CRNAs hold national certification. No educational program for this professional is offered in Georgia. The closest programs are in Florida and in Alabama.

Nationwide there are approximately 25,000 nurse anesthetists (CRNA) (Moses, 1992). In the 1995 RN Renewal survey, 1,082 RNs reported certification in this field in Georgia (GBN, 1995).

Georgia hospital respondents reported employing 55 fte current personnel in this field, with 7 fte budgeted vacancies (Table 8). Statewide the vacancy rate is at 11.6 percent, a slight decrease from the 1991 vacancy rate of 12.6 percent (Table 9). No growth is expected. Supply and demand in this field appears to remain relatively stable over time and in near balance. The above-average wage for this advanced practice area likely slows turnover and affects net growth.

Summary

The supply of and demand for registered nurses is in the best balance in Georgia since 1985. The number and geographic distribution of educational programs in Georgia to prepare professional nurses has been important in increasing the supply of registered nurses and in bringing about this change. Additionally, managed care and other organizational changes in health care delivery have sought to constrain costs and, thus health care institutions appear more conservative in reporting vacancies for RNs and in projecting future employment. Also, during the course of this study, a few large hospitals, reflecting trends to outpatient services, downsized their hospital staffs and reduced the number of RN positions.

The ongoing attempts to control costs and simultaneously extend services has increased the demand for nurse practitioners nationally and in Georgia. As noted, vacancy rates for nurse practitioners were up over the previous studies, the number of educational programs has increased dramatically, and projections of future growth are strong. Presently, these professionals are wanted to provide frontline care in both inpatient and community settings. The utilization by this professional in managed care settings will likely be high.

Licensed Practical Nurses

Nationwide and in Georgia, registered nurses significantly outnumber licensed practical nurses; consequently, LPNs are the second largest occupational category in the hospital setting. LPN employment is strong in hospitals and nursing homes, as well as in the offices of private practitioners. LPNs and aides are most prominent in the nursing home sector. The aging of the population and an expanded need in the level of care have increased the demand for LPNs in nursing homes.

The Bureau of Labor Statistics estimates that 702,000 LPNs were active nationwide in 1995, 276 per 100,000 population (Table 6). According to the State Examining Boards, in fall 1995 a total of 20,747 practical nurses were licensed in Georgia. If all of the licensees were active, the statewide practitioner-to-population rate would be 294 per 100,000 population. Based upon 1995

TABLE 10
PRACTICAL NURSING PROGRAMS IN GEORGIA, 1995

Albany Technical Institute
Altamaha Technical Institute (Satellite: Hazlehurst)
Athens Area Technical Institute
Atlanta Area Technical Institute
Augusta Technical Institute
Bainbridge College
Ben Hill-Irwin Technical Institute
Brunswick College
Carroll Technical Institute
Chattahoochee Technical Institute
Columbus Technical Institute
Coosa Valley Technical Institute
Dalton College
Dekalb Technical Institute
Flint River Technical Institute (Satellite: Roberta)
Griffin Technical Institute
Gwinnett Technical Institute
Heart of Georgia Technical Institute (Satellite: Eastman)
Kindelin Technical Institute
Lanier Technical Institute
Macon Technical Institute (Satellite: Milledgeville)
Middle Georgia Technical Institute
Moultrie Area Technical Institute
North Georgia Technical Institute
Ogeechee Technical Institute
Okefenokee Technical Institute
Pickens Technical Institute
Putnam County School of Practical Nursing
Savannah Technical Institute (Satellite: Hinesville)
Southeastern Technical Institute (Satellite: Glennville)
South Georgia Technical Institute (Satellite: Crisp)
Swainsboro Technical Institute (Satellite: Metter)
Thomas Technical Institute
Tift County School of Practical Nursing
Valdosta Technical Institute
Walker Technical Institute
West Georgia Technical Institute

licensure data, 15,959 LPNs reported employment in Georgia, a rate of 226 per 100,000 population. This rate is down slightly from the 251 per 100,000 based on the 1989 licensure data (Morris, 1992). Historically, Georgia's LPN practitioner-to-population rate has been slightly higher than the national rate. Based on current data, this trend may be changing.

According to the Georgia State Board of Examiners of Licensed Practical Nurses Renewal Survey (1995), 93 percent of LPNs statewide are female, and 30 percent are African-American. Thirty-four percent are employed in hospitals, with nursing homes a close second with 29 percent of LPNs statewide. A total of 13,285 reported working full-time, and 2,662 reported part-time work. The Georgia Department of Labor (1995) reports that the Atlanta region claims approximately one-half of total employment.

Statewide, there are 46 programs in practical nursing taught by 37 institutions (GBLPN, 1996). The programs are relatively evenly distributed across the state (Table 10).

The Bureau of Labor Statistics projects the addition of 197,000 practical nursing jobs over the period 1994-2005, a growth rate of 28 percent (Table 6). In Georgia, LPN employment is projected to grow by an additional 6,000 to 7,000 jobs over the next ten years (GDOL, 1995). From the 1995 survey, the hospital respondents statewide did not project any growth in this category to the year 2000 and reported a slight decrease in employment.

The survey of Georgia's hospitals found 219 vacancies and 3,247 fte LPN filled positions (Table 8). The vacancy rate of 6.3 percent was down slightly from 8.6 percent in 1991. A total of 88 fte vacancies for LPNs were reported in the nursing home sector (4.5%). In 1991, LPN vacancies in nursing homes averaged 5.8 percent and in 1986, 5.5 percent. In home health care, a 5.4 percent vacancy rate was found; the same level as 1986 and down slightly from 1991 (7.4%) (Table 9). Thus, in all three sectors, vacancy rates for LPNs have declined slightly, but each sector continues to show a current demand and a low-to-moderate vacancy rate in this occupational category.

As noted above, LPN employment is projected to grow between in the home health care setting and in nursing homes. A total of 115 positions (28% growth) was projected by home health respondents, and a total of 204 new positions (10.5 percent growth) was predicted by the nursing home respondents.

LPN employment by the hospital respondents, however, is projected to decline between 1995 and 2000, equalling 141 fte positions, a 4.1 percent decline.

In 1986, the respondents to that year's survey of hospitals also projected a small decline in LPN employment over the five upcoming years, but that decline, as revealed by the 1991 data, did not occur. Current health care changes, however, are even more dramatic than in the late 1980s, and the continuing declines in hospital-based services may result in a lesser need for lower skilled nurses. As noted earlier, the hospital respondents also reported a small decline (1.2%) in registered nursing employment over the next five years.

Because LPNs are used in a variety of health care settings including institutional and private offices and clinics, employment opportunities should continue to remain strong for Georgia's LPN graduates. Although current vacancy rates statewide are somewhat lower than in previous studies, hospitals, nursing homes, and home health care agencies will continue to require this health care worker because of attrition, shortages of RNs in certain geographic areas, growth in the aged population, and increased demand for nursing personnel with higher skills than provided by aides and assistants. The current educational programs in the state are well distributed geographically, and continue to accommodate slight shifts in supply and demand.

Therapy Health Professions

Physical Therapy

Physical therapy is the field of medical care that uses exercise and such physical agents as heat, light, water and massage to treat certain physical disabilities. Physical therapists (PTs) are health care professionals who evaluate and treat people with health problems resulting from injury or disease. These professionals assess joint motion, muscle strength and endurance, function of heart and lungs, and performance of activities required in daily living, among other responsibilities. Although some of the techniques of physical therapy have been in common use for centuries (the use of massage, for instance, or of hot baths to relieve muscular strain), the field came into existence as a health care specialty only after World War I, when programs for the physical rehabilitation of wounded soldiers were first devised. The profession also received great impetus from the necessity to create new programs in order to rehabilitate the victims of the polio epidemics of the 1930s to 1950s.

Education

The minimum educational requirement for becoming a PT is a baccalaureate degree from an accredited education program. An increasing number of programs prepare students at a master's degree level. Since 1970, the number of accredited PT educational programs has more than tripled (American Physical Therapy Association [APTA], 1992). As of August 1995, there were 148 accredited educational programs nationwide and 41 developing programs, including 1 doctoral program (Goldstein, 1995). Reflecting the increase in programs, PT graduates have more than doubled since 1980. Between 1989 and 1993, the total number of graduates annually grew by 1000, reaching a high of 5,267 physical therapist graduates nationwide in 1993. APTA estimates over 5,500 will graduate in 1996.

There are four entry-level programs in Georgia: Medical College of Georgia, Georgia State University, Emory University, and North Georgia College (Table 11). Armstrong State College has plans for a fully accredited program by 1997. Emory, North Georgia, and MCG offer the master's degree as the entry-level degree. The number of graduates from PT programs in Georgia has grown

TABLE 11
EDUCATIONAL PROGRAMS IN GEORGIA
THERAPY PROFESSIONS

Physical Therapy
- Emory University
- North Georgia College
- Medical College of Georgia
- Georgia State University
- Armstrong College (Developing)

Physical Therapy Assistant
- Medical College of Georgia
- Thomas Technical Institute
- Gwinnett Technical Institute
- Darton College (Developing)
- Middle Georgia College (Developing)
- Athens Area Technical Institute (Developing)
- Floyd College (Developing)

Occupational Therapy
- Medical College of Georgia

Occupational Therapy Assistant
- Medical College of Georgia
- Middle Georgia College (Developing)

Respiratory Care
- Armstrong State College (AD)
- Athens Area Technical Institute (AD)
- Augusta Technical Institute (AD)
- Columbus College (AD)
- Coosa Valley Technical Institute (Diploma)
- Darton College (AD)
- Georgia State University (Bachelor's; Master's)
- Gwinnett Technical Institute (AD)
- Heart of Georgia Technical Institute (Diploma)
- Macon College (AD)
- Medical College of Georgia (Bachelor's)
- Okefenokee Technical Institute (Diploma)
- Thomas Technical Institute (Diploma)

from just under 100 in 1990 to 147 in 1995 (Table 12). This increase can be attributed to Georgia State expanding the number of student slots from 35 to 52 in 1993, and 22 graduates from North Georgia's first class in 1995. Because applicants to PT programs remain high, it is likely that Georgia will soon graduate 150 or more each year.

TABLE 12
PHYSICAL THERAPIST GRADUATES IN GEORGIA
1990-1995

	1990	1991	1992	1993	1994	1995
Emory	26	26	34	32	32	32
Georgia State	31	35	33	35	35	51
MCG	42	43	43	42	44	42
North Georgia*						22
Totals	99	104	110	109	111	147

* First class of graduates
Source: USGA Board of Regents, 1996; Emory, 1996.

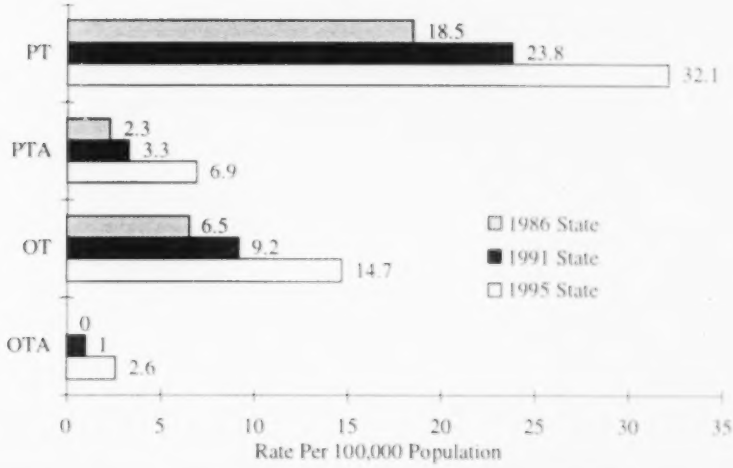
Supply: U.S. and Georgia

The American Physical Therapy Association estimates that over 97,000 physical therapists are licensed in the U.S. today. Of this population, 74 percent (71,780) practice full-time, 19 percent (18,430) practice part-time, and 7 percent (6,790) are not practicing or are retired. Based on these estimates, 90,210 physical therapists were active nationwide in 1995, 35 therapists per 100,000 population (APTA, 1995).

In Georgia, a total of 3,030 physical therapists were licensed by the Georgia State Board of Physical Therapy in 1995, and of this number, 2,267 were instate licensees. For all of those licensed and living within Georgia, the practitioner-to-population rate was at 32.1 per 100,000 population (SEB, 1995). The total number of instate licensees has increased dramatically from 1986 when 18.5 per 100,000 population were licensed in Georgia and from 1991 when 23.8 were identified per 100,000 population (Figure 4). It is important to note that the

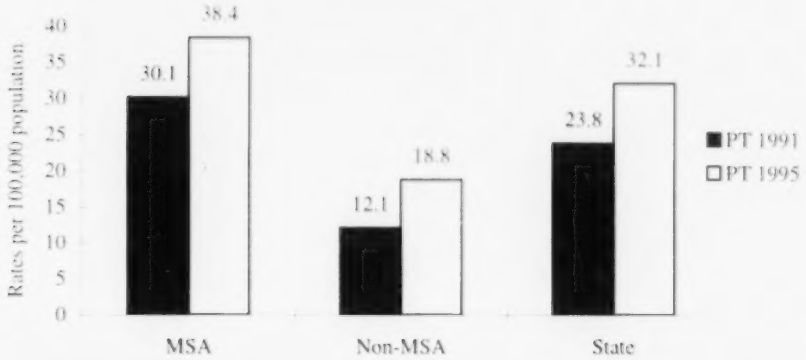
actual number of active practitioners in Georgia is unknown and cannot be determined from the state licensure data; however, using an activity rate of 85 percent of current licensees yields a current estimate of 1,927 practitioners statewide, 27 per 100,000 in Georgia.

FIGURE 4
PRACTITIONER-TO-POPULATION RATES, THERAPY HEALTH PROFESSIONALS



The Georgia supply of PTs is heavily concentrated in the metropolitan areas of the state with 38.4 per 100,000 of instate licensees residing in metro counties and a much lower 18.8 per 100,000 in nonmetro counties (Figure 5). Both geographical areas have gained in PTs per population, however, since 1991 when the nonmetro ratio was estimated at 12.1 per 100,000 and the metro at 30.1 per 100,000 population (Figure 5). Percentagewise, the nonmetro areas made greater gains in physical therapists to population than the metro areas during the 1991-1995 period; however, the metro counties continue to have twice the number of PTs per population as compared to the nonmetro counties.

FIGURE 5
RATES OF PHYSICAL THERAPISTS,
GEORGIA URBAN AND RURAL AREAS,
1991 AND 1995



Demand: U.S. and Georgia

Physical therapy is one of the high-demand fields in Georgia and the United States. According to the American Physical Therapy Association, the current demand exceeds the supply by approximately 11,000 positions nationwide (Goldstein, 1995). In keeping with the trend to outpatient services, an estimated one-third of physical therapists nationwide work in the hospital-setting; while others are increasingly found in private offices, home health agencies, corporate or industrial health centers, sports facilities, and research institutions.

In Georgia, approximately 30 percent of therapists are hospital-based. The national shortage, however, has been consistently felt in the hospital sector. In 1986 and 1991 Georgia hospitals reported vacancy rates of 15 and 20 percent, respectively, and in 1995 the vacancy rate in Georgia hospitals was reported as 19 percent (Table 13). As in previous studies, the hospital respondents in this survey repeatedly listed physical therapists as difficult to recruit and retain. The ability of hospitals to attract and retain physical therapists has been negatively affected by statewide shortages and employment opportunities for physical therapists in many other settings.

The PT vacancy rate in nursing homes over the past decade moved from 8 percent in 1986 up to 17 percent in 1991 and back to 9 percent in the most recent

survey. The PT vacancy rate in Georgia's home health care sector during this period remained between 18 and 19 percent (Table 13). The 1995 survey of Georgia's hospitals, nursing homes and home health care identified 88 fte vacancies by the respondents. When non-respondents are considered, an estimated 175-200 vacancies exist across the entire institutional sector (Table 14).

TABLE 13
PHYSICAL THERAPISTS VACANCY RATES, GEORGIA HOSPITALS, NURSING HOMES & HOME HEALTH CARE AGENCIES, 1986, 1991, AND 1995

Institutional Category	1986	1991	1995
Hospital	15.1%	19.8%	19.1%
Nursing Home	8.1%	17.4%	9.4%
Home Health Care	19.4%	17.8%	19.4%

Future Demand

Also affecting the demand for physical therapists is the projected rapid growth in new positions. The 1995 survey respondents project growth in Georgia hospitals at 20 percent; in nursing homes, 49 percent; and in home health care 48 percent (Table 15). This projected growth will add 154 new positions by the respondents, or 308, accounting for nonrespondents. Home health care respondents projected the addition of 70 fte, the largest amount of positions over the five-year period, 1995-2000 (Table 15). Retention and

TABLE 14
PHYSICAL THERAPIST EMPLOYMENT, 1995

Institutional Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Hospital	231	54	285	19.1
Nursing Home	53	6	59	9.4
Home Health Care	117	28	146	19.4

recruitment of this professional are affected by the competition from other employment settings, as well as the overall undersupply.

The Bureau of Labor Statistics projects employment in physical therapy to increase by 79 percent (i.e., 81,000 jobs), between 1994 and 2005, reaching a high of 183,000 in 2005 (Table 6). Growth in Georgia between 1992 and 2005 is projected at 66 percent, approximately 1,600 new positions (GDOL, 1994). Currently, average annual openings are estimated at 160 (i.e., 120 for growth, 40 for separations). The current new supply in Georgia from education is approximately 150 PTs.

TABLE 15
PROJECTED GROWTH OF PHYSICAL THERAPISTS IN GEORGIA, 1995

Institutional Category	1995 FTE	2000 FTE	Projected Growth	Increase (%)
Hospital	285	340	55	19.5
Nursing Home	59	88	29	49.2
Home Health Care	146	216	70	48.0

Summary

An estimated 200 fte vacancies for physical therapists exist across Georgia's hospitals, nursing homes, and home health care agencies; this sector projects the addition of approximately 275-300 new positions during the next five years. This estimate of vacancies and growth is in line with the growth projected by the Georgia Department of Labor. The demand for PTs in the private sector was not measured, but the lower practitioner-to-population ratios in nonmetropolitan areas and the high vacancy rates in the institutional settings coupled with the high ratio of PTs in metro counties suggest that private practice settings (e.g., contract and temporary services) in urban areas may be the only sector in Georgia with a near-adequate supply. Presently, by all estimates, the statewide demand for PTs out paces rather significantly the current supply.

Expansions in Georgia's educational sector through the addition of two new programs and additional student slots in another program will assist in increasing

Georgia's supply to meet demand. The number of PT programs nationally is ready to expand dramatically, adding 41 new programs to the existing 148 programs. National changes in the supply will certainly have an impact on a large state like Georgia, that ranks 11th in population overall.

Managed care also will figure dramatically into the supply and demand equation. If physical therapy follows the scenario suggested by a recent occupational therapy workforce study, the demand for PTs may decline slightly over the next few years and the demand for PTAs may increase substantially in response to efforts by managed care networks to control costs through changing the workforce composition and adjusting requirements for services.

Presently, attention needs to continue to be focused on the current undersupply in Georgia, more prevalent in some areas than others, and on establishing methods to estimate needs for PTs beyond the institutional sector.

Physical Therapy Assistants

Physical therapy assistants work under the supervision of physical therapists. Their duties include assisting the physical therapist in implementing treatment programs, training patients in exercises and activities of daily living, conducting treatment, and reporting to the physical therapist on the patient's response.

Physical therapy assistants must complete a two-year education program. This course of study includes one year of general education and one year of technical courses on physical therapy procedures and clinical experience. Graduates receive an associate degree. Although not required in all states, Georgia requires PTAs to be licensed to practice.

Nationwide, there are 176 established PTA programs and 63 developing programs (Goldstein, 1995). The numbers of PTA programs nationally have more than doubled since 1985, when 67 were accredited (APTA, 1994). A paucity of educational data on PTAs exists at the national level, however the APTA estimates that the numbers of PTA graduates have increased 70 percent, from 900 in 1985 to over 2,000 in 1994 (APTA, 1994).

In Georgia, physical therapy assisting is offered at MCG, Gwinnett Technical Institute, and Thomas Technical Institute (Table 11). The number of PTA graduates has increased from 9 in 1990 to 62 in 1995 (Table 16). The Medical College of Georgia has graduated a total of 163 students over 18 years

(1977-95) (MCG, 1995). Several other programs (Darton College, Middle Georgia College, Athens Area Technical Institute, and Floyd College) are in the development stage (APTA, 1996).

In 1993, a total of 21,603 physical therapy assistants were regulated in the U.S., Virgin Islands, District of Columbia, and Puerto Rico, approximately 8.5 PTAs per 100,000 population (Gwyer, 1995).

In addition to the question of what percentage is truly "active" in the field, a complicating factor in establishing the supply of PTAs is the practice of grouping PTAs with other therapy aides. The Bureau of Labor Statistics, as well as the Georgia Department of Labor, includes physical therapy assistants in the category of "physical and corrective therapy assistants and aides." For the overall category, the Georgia Department of Labor reported 1,900 in employment. The State Examining Board data show that 663 physical therapy assistants are licensed for practice, and 487 reside in the state (SEB, 1995). The number of licensed PTAs in Georgia has more than tripled since 1990, when 221

TABLE 16
PHYSICAL THERAPY ASSISTANT GRADUATES IN GEORGIA, 1990-1995

	1990	1991	1992	1993	1994	1995
MCG	9	15	17	17	15	16
DTAE	0	15	24	30	47	46
Totals	9	30	41	47	62	62

DTAE = Gwinnett Tech (1991) and Thomas Tech (1994)

Source: MCG Fact Book, 1995; Department of Technical and Adult Education, 1996.

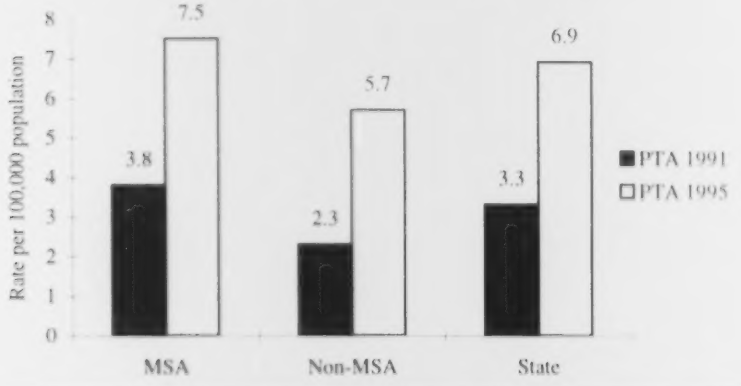
were registered (Morris, 1992). Between 1986 and 1995 the practitioner-to-population ratio in Georgia increased significantly, from 2.3 per 100,000 in 1986 to 6.9 per 100,000 in 1995 (Figure 4). In 1995, more PTAs practiced in urban areas than rural areas: 7.5 per 100,000 population and 5.7 per 100,000 respectively (Figure 6). Since 1991, the ratio of PTAs to population has grown more rapidly in rural areas than in urban areas.

Demand: U.S. and Georgia

Physical therapy assistants practice in a variety of healthcare settings. In Georgia, 32 percent of PTAs are employed by hospitals; 9 percent by nursing homes; 7 percent by home health care, while approximately 40 percent also work in the private sector for other health care practitioners (GDOL, 1995).

Georgia hospital respondents in 1995 reported 130 fte positions, with 18 fte budgeted vacancies (Table 17). Statewide vacancy rates for PTAs in the hospital setting increased from 7.3 percent in 1986 to 12.3 percent in 1995 (Table 18). Nursing home respondents reported 71 fte positions, with 7 fte budgeted vacancies (Table 17). The vacancy rate of nursing homes was lower than hospitals, 9 percent, but many nursing homes mentioned PTAs as one of the most difficult professionals to recruit and retain. Home health care agencies reported the lowest level of employment, 30 fte, but the highest vacancy rate (28.9), with

FIGURE 6
RATES OF PHYSICAL THERAPIST ASSISTANTS, GEORGIA URBAN AND RURAL AREAS, 1991 AND 1995



12 fte budgeted vacancies (Table 17). In 1986, home health care employed only 3 fte PTAs and reported 3 fte vacancies, thus the high vacancy rate.

The Georgia Department of Labor projects growth of 66 percent between 1992 and 2005 for PTAs, with 120 average annual openings (GOICC, 1995). The U.S. Department of Labor projects employment in this overall category to increase by 82 percent between 1994 and 2005 (Table 6). Georgia hospital,

TABLE 17
PHYSICAL THERAPY ASSISTANT EMPLOYMENT, 1995

Institutional Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Hospital	130	18	148	12.3
Nursing Home	71	7	78	9.0
Home Health Care	30	12	42	28.9

nursing homes and home health care respondents estimated in five years PTAs will grow by 101 fte positions (Table 19). Extrapolating for nonrespondents, over 200 fte positions should become available in these areas. The state's educational programs graduate approximately 50 - 60 students every year, a number that is currently insufficient to meet the demand for this professional.

In summary, physical therapy is expected to experience the largest growth of any professional allied health field over the next 15 years. The current undersupply in Georgia, for both physical therapists and physical therapy assistants, combined with projected growth in future demand, will continue to yield an imbalance in the supply and demand throughout this decade. As several new PTA programs develop, faster increases in the number of graduates should bring supply and demand for assistants into balance. Over the next decade, the undersupply of physical therapists should also lessen as new programs nationwide and in Georgia become fully productive.

TABLE 18
PHYSICAL THERAPY ASSISTANT VACANCY RATES, GEORGIA HOSPITALS, NURSING HOMES & HOME HEALTH CARE AGENCIES, 1986, 1991, AND 1995

Institutional Category	1986	1991	1995
Hospital	7.3%	11.5%	12.3%
Nursing Home	5.1%	4.6%	9.0%
Home Health Care	50.0%	--	28.9%

TABLE 19
PROJECTED GROWTH OF PHYSICAL THERAPY ASSISTANT
IN GEORGIA, 1995

Institution	1995 FTE	2000 FTE	Projected Growth	Increase (%)
Hospital	148	185	37	25.1
Nursing Home	78	107	29	37.2
Home Health Care	42	77	35	83.3

Occupational Therapy

Occupational therapy uses everyday activities to assist people with physical and/or mental disabilities achieve independence. Occupational therapy aims to restore or increase muscle strength and motor ability in physically disabled people so that they may perform required daily activities such as dressing, bathing, and eating. They also work to assist the handicapped to train or retrain and thus to perform other daily responsibilities such as caring for home, holding employment, or participating in education.

While physical therapy might be described as treatment focused on helping the person with a disability to regain movement in affected limbs or joints, occupational therapy looks at psychological and social concerns, as well as physical factors, and assists the person in performing activities necessary to function in home, school, or work environments. Occupational therapy also assists in promoting functional independence for persons with mental illness. Occupational therapists work in a variety of settings including hospitals, nursing homes, and rehabilitation settings.

Education: U.S. and Georgia

Educational preparation for occupational therapists occurs at the baccalaureate, post-baccalaureate certificate, or master's level. In 1994, 85 colleges offered entry-level educational programs for occupational therapists, up from 69 in 1990. A total of 3,731 students graduated from entry-level programs in

1994, up from 2,495 graduates in 1990. Between 1993 and 1994, an 18 percent increase in the number of graduates was reported by the American Occupational Therapy Association (1995). The rapid growth in enrollments and programs is shown when it is noted that in 1970, 37 colleges graduated only 720 students (AOTA, 1995). The Medical College of Georgia offers the state's only program and graduates approximately 35 students per year (Table 20). According to the AOTA (1995), over the time period 1988-1994, approximately 10 percent of overall enrollments were male and approximately 10 percent were minority students.

TABLE 20
OCCUPATIONAL THERAPIST GRADUATES IN GEORGIA
1990-1995

	1990	1991	1992	1993	1994	1995
MCG	30	28	37	40	43	32

Source: MCG Factbook, 1995

Supply: U.S. and Georgia

Of the 46,000 occupational therapists (OTs) in the workforce in 1994, an estimated 42,000 were actively employed, yielding an activity rate of 90 percent (AOTA, 1994a). In 1993, the AOTA reported a U.S. practitioner-to-population rate of 17.1 and a Georgia rate of 9.7 (Silvergeit, 1994a). The Georgia Department of Labor estimated 757 OTs active in Georgia in 1992, yielding a rate of 9.6 per 100,000 population (GDOL, 1995). In 1993, Georgia fell in the lowest quartile of states in practitioner-to-population ratios for this profession.

Based on Georgia licensure data, in November 1995 there were 1,039 instate occupational therapists, yielding a rate of 14.7 licensees per 100,000 population. Based on an activity rate of 90 percent, the practitioner-to-population rate drops to 13.3 per 100,000 population. The supply of OTs in Georgia has increased dramatically since 1986 when 6.5 per 100,000 were identified in state, followed by 9.2 in 1991, and the current 14.7 per 100,000 population (Figure 4).

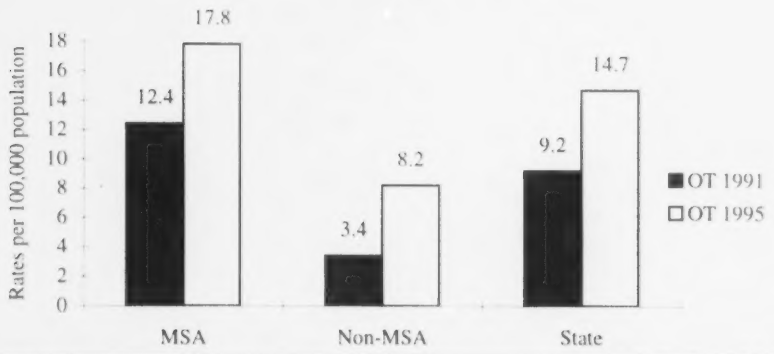
The distribution of occupational therapists across the state, however, is quite uneven: considering all instate licensees, the metropolitan counties claim 17.8 OTs per 100,000 population while the nonmetro counties claim only 8.2 per 100,000 (Figure 7). Since 1991, however, both urban and rural areas have increased their supply of OTs.

The actual number of OTs employed full-time or part-time in Georgia is somewhere between the AOTA's estimate of the Georgia workforce and the total number of licensees in the state. Using any of the estimates, the Georgia supply is significantly lower than the U.S. rate of practitioners to population, and Georgia's rural rate of practitioners to population is less than one-half of the urban rate.

Demand: U.S. and Georgia

Hospital vacancy rates are important for gauging demand in occupational therapy, as between 40 and 50 percent work in this setting in Georgia (GDOL, 1995). The hospital vacancy rate for occupational therapists nationwide and in Georgia has remained high over time. In 1986 and 1991, Georgia hospitals reported vacancy rates of 16 and 22 percent, respectively (Table 21). In 1995, the hospital respondents reported an OT vacancy rate of 18 percent, totaling 30 fte vacancies (Table 22).

FIGURE 7
RATES OF OCCUPATIONAL THERAPISTS, GEORGIA URBAN AND RURAL AREAS, 1991 AND 1995



Nursing homes and home health care agencies employ slightly less than 10 percent of Georgia's OT workforce (GDOL, 1995). In 1995, the nursing home vacancy rate was 4 percent and in home health care agencies, 45 percent. The number of fte vacancies in home health care (n=16 fte) is less than the 30 fte in the hospital sector, but signifies the growth of occupational therapy in home health (Table 22). Based on a demand model, the AOTA estimates the national shortage overall at 15 percent (Silvergeit, 1994b).

In response to the question, "are there any occupational categories for which you have persistent recruitment problems?", hospital respondents replied "yes." Most often cited were occupational and physical therapists. Several respondents also mentioned certified OT assistants and licensed PT assistants.

TABLE 21
OCCUPATIONAL THERAPIST VACANCY RATES,
GEORGIA HOSPITALS, NURSING HOMES & HOME HEALTH CARE AGENCIES,
1986, 1991, AND 1995

Institutional Category	1986	1991	1995
Hospital	16.1%	21.6%	18.0%
Nursing Home	9.4%	NA	4.1%
Home Health Care	18.6%	29.1%	44.7%

Future Growth

The Bureau of Labor Statistics estimates that jobs for occupational therapists will increase by 72 percent between 1994 and 2005, moving from a workforce of 54,000 to 93,000 (Table 6). The Georgia Department of Labor projects the addition of approximately 400 jobs between 1994 and 2005, a 53 percent increase (GDOL, 1995). The Department shows average annual openings due to growth and separations at 40, just slightly ahead of annual graduation totals.

Table 23 shows the growth projected by those responding to the 1995 survey. The Georgia hospital respondents project a 19 percent growth in OT employment between 1995-2000, while the nursing homes and home health care agencies report larger percentages and nearly equal numerical growth.

TABLE 22
OCCUPATIONAL THERAPY EMPLOYMENT, 1995

Institutional Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Hospital	134	30	164	18.0
Nursing Home	46	2	48	4.1
Home Health Care	21	16	37	44.7

Together, Georgia's hospitals, nursing homes, and home health care project the addtion of a total of 92 fte openings over the next five years (Table 23).

Current OT vacancies reported in Georgia's institutional settings totaled 49 fte and extrapolated for nonrespondents in this sector equals 98 fte (Table 22). Projected growth by the respondents equaled 92 fte and extrapolated equals 184. Together, 282 fte vacancies will occur in this sector over a five-year period. Other settings might add 50 to 75 open positions. Educational productivity during this time should add 175-200 active therapists; thus, the current educational supply will not meet the demand during the next five years. An important consideration, however, are the changes being brought about in the workforce mix through managed care.

TABLE 23
PROJECTED GROWTH OF OCCUPATIONAL THERAPISTS IN GEORGIA, 1995

Institution	1995 FTE	2000 FTE	Projected Growth	Increase (%)
Hospital	164	195	31	19.1
Nursing Home	48	80	32	66.7
Home Health Care	37	66	29	76.3

Summary

Occupational therapists continue to be in high demand in Georgia and across the nation, although projections in a newly released report by the AOTA show supply and demand, using a "marginal change" scenario, as coming into balance in 2005. The AOTA study, *Health Care and Market Reform: Work Force Implications for Occupational Therapy*, predicts that the more likely scenario is one of "moderate change" in which the 1995 supply of OTRs (i.e., OTs) will likely exceed the requirements coupled with a slight increase in requirements for COTAs (OTAs) to provide therapy services. This scenario emerges from an emphasis by managed care to contain costs and control services through an alteration of the composition of the skill mix of the work force. The report predicts that work force shortages in occupational therapy on a national basis will end during the next decade based on changes in managed care and the rapid and ongoing growth in the capacity and output of the OT/OTA educational programs.

Georgia may well be subject to these changes as we move toward the end of the century and as managed care spreads across the state. Thus, if the existing program at the Medical College of Georgia increased its output of graduates even slightly, supply and demand might well come into balance over the next 5 to 10 years.

The distribution of OTs, however, may remain a concern for the foreseeable future, as the majority of OTs are located in urban settings. Similar to physical therapy, services may be provided across the region in satellite offices; therefore, it is necessary to monitor the distribution and availability of services as well as the distribution of full-time occupational therapy professionals.

Occupational Therapy Assistants

Occupational therapy assistants are supervised by occupational therapists and may also provide some evaluations, as well as planning and carrying out treatment programs. To practice in Georgia, assistants must graduate from an accredited education program and pass a national certification examination; thereby yielding the designation certified occupational therapy assistant (COTA).

Nationally, the number of colleges offering accredited programs for occupational therapy assistants has grown from 22 in 1970 to 94 in 1994 (AOTA,

1995). Graduates over this time period increased from 254 to 2,103. During a single year, American Occupational Therapy Association (AOTA) accredited 17 additional schools for technical-level education and the total number of graduates increased by more than one-quarter over the previous year (AOTA, 1995).

The Medical College of Georgia offers the only accredited associate degree program in Georgia (AOTA, 1995), and graduates approximately twelve students each year. As shown in Table 24, the number of graduates has increased or held steady since 1990. The AOTA also recognizes one "developing" program at Middle Georgia College (AOTA, 1994). Reportedly, OTA training programs are also under development at several state technical institutes (DTAE, 1995).

According to the American Occupational Therapy Association (AOTA, 1994a), there are 10,705 COTAs, or 4.3 per 100,000 population, nationwide; and in Georgia, there are 98 COTAs, 1.3 per 100,000 population. Based on Georgia licensure data, the supply of occupational therapy assistants is small, with less than 181, 2.7 per 100,000 population, licensed and living in the state. This rate represents an increase from less than 1 per 100,000 population in 1986 (Figure 8). In 1995, slightly more OTAs were located in urban areas (3.1 per 100,000 population) than in rural areas (2.6 per 100,000 population). However, Figure 8 shows rural areas have had the greater change in practitioners-to-population since 1991, increasing from 0.3 per 100,000 to 2.6 per 100,000.

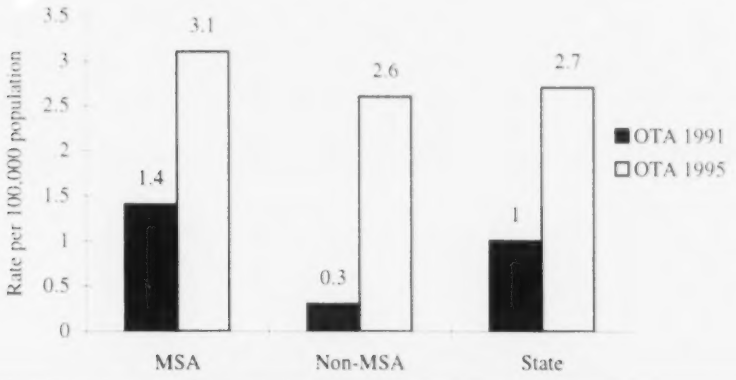
This professional is sought for a variety of health care settings. According to AOTA, the national vacancy rates for OTAs varied between 9.3 and 30.1

TABLE 24
OCCUPATIONAL THERAPY ASSISTANT GRADUATES IN GEORGIA, 1990-1995

	1990	1991	1992	1993	1994	1995
MCG	1	5	10	13	14	12

Source: MCG Factbook, 1995

FIGURE 8
RATES OF OCCUPATIONAL THERAPY ASSISTANTS, GEORGIA URBAN AND RURAL AREAS, 1991 AND 1995



percent, with the average of 17.4 percent. In a given state, vacancy rates for OTAs tend to exceed those of OTs. Using two methods to determine demand, AOTA estimates the demand -based shortage of OTAs to be around 17 percent and the need-based shortage to be as high as 250 percent.

Nearly 83 percent of Georgia OTAs work in hospital settings; only 3 percent are employed by nursing homes (GDOL, 1995). The hospital vacancy rate for OTAs has been increasing steadily, from 6.6 percent in 1986 to 27 percent in 1995 (Table 25). In 1995, the Georgia hospital respondents reported 13 fte budgeted vacancies and a projected growth of 28 fte. In 1995 OTAs were in demand in nursing homes also, with a vacancy rate of 8 percent (Table 26a).

TABLE 25
OCCUPATIONAL THERAPY ASSISTANT VACANCY RATES, GEORGIA HOSPITALS, 1986, 1991, AND 1995

Institutional Category	1986	1991	1995
Hospital	6.6%	13.4%	26.0%

TABLE 26a
OCCUPATIONAL THERAPY ASSISTANT EMPLOYMENT, 1995

Institutional Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Hospital	37	13	50	26.0
Nursing Home	23	2	25	8.0
Home Health Care	5	3	8	36.6

Between 1994 and 2005, the GDOL estimates that the number of OTA positions in Georgia will grow from 200 to 330.

The number of OTA vacancies in the institutional sector currently in Georgia totals 18 fte and extrapolated equals 36 or more fte (Table 26b). Projected growth equals 53 fte and extrapolated equals 106 or more fte. Thus, approximately 135 to 140 fte vacancies are calculated in the institutional sector over the next five years. With only 12 to 14 graduates per year from the current educational program, the supply of OTAs is not sufficient to meet this demand. The developing programs, however, should assist in easing the current imbalance. The impact of changing the skill mix of OTs and OTRs on the assistants is uncertain, and likely the outcome will only be known as new workplace requirements are set in motion.

TABLE 26b
PROJECTED GROWTH OF OCCUPATIONAL THERAPY ASSISTANTS IN GEORGIA, 1995

Institution	1995 FTE	2000 FTE	Projected Growth FTE	Increase (%)
Hospital	50	78	28	56.0
Nursing Home	25	50	25	100.0

Respiratory Therapy

Respiratory care practitioners, including respiratory therapists and respiratory therapy technicians, work to evaluate, treat, and care for patients with breathing disorders. While most respiratory care practitioners work in hospitals, an increasing number of them have moved into alternate care settings, such as nursing homes, physicians' offices, home health agencies, patient homes, and medical supply companies.

Respiratory care has two active levels of practitioners: respiratory therapists and respiratory therapy technicians. Technicians undergo a 12 to 18 month program of study and receive a diploma or certificate upon completion. Upon graduation, respiratory therapy personnel may take the national voluntary examination offered by the National Board of Respiratory Care (NBRC) that leads to the certified respiratory therapy technician (CRTT) credential. Graduates of the two-year associate degree or four-year baccalaureate degree programs, after successfully passing the CRTT examination, may take the national examination that leads to the registered respiratory therapist (RRT) credential. Technicians who have graduated from certificate programs, following a period of active practice, may pursue the RRT credential through a variety of pathways outlined by the NBRC.

Nationwide, nearly 400 community colleges and universities offer respiratory care programs (American Association for Respiratory Care [AARC], 1996). There are 13 accredited respiratory care programs in Georgia: 2 offer baccalaureate degrees; 7, associate degrees; and 4, diplomas (Table 11).

TABLE 27
RESPIRATORY THERAPY GRADUATES IN GEORGIA,
1992-1994

	1992	1993	1994
USGA	63	75	80
DTAE	82	73	74
Totals	145	148	154

Source: USGA Board of Regents, 1996; DTAE, 1996.

TABLE 28
RESPIRATORY THERAPY PERSONNEL VACANCY RATES,
GEORGIA HOSPITALS,
1986, 1991, AND 1995

Occupational Category	1986	1991	1995
Respiratory Therapist	10.2%	8.9%	6.7%
Respiratory Therapist Technician	4.9%	6.2%	4.2%

Approximately 150 students annually graduate from Georgia programs (Table 27). Recently, the number of diploma graduates has decreased in favor of associate degrees.

Since its inception, the National Board for Respiratory Care (NBRC) has issued approximately 200,000 professional credentials: approximately 59,700 as respiratory therapists and about 130,000 as certified respiratory therapy technicians. Over 5,000 have been credentialed in Georgia: 1,767 RRTs and 3,475 CRTTs (NBRC, personal communication, 1996). Practice in Georgia is regulated by the Composite State Board of Medical Examiners, and applicants are required to be credentialed by the National Board for Respiratory Care, and/or meet other specified qualifications. The Board recognizes just over 3,000 as eligible for practice in Georgia (personal communication, 1996). An estimated

TABLE 29
RESPIRATORY THERAPY EMPLOYMENT, 1995

Occupational Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Respiratory Therapist				
Hospital	344	25	369	6.7
Respiratory Therapist Technician				
Hospital	318	14	332	4.2

TABLE 30
PROJECTED GROWTH OF RESPIRATORY THERAPY PERSONNEL IN GEORGIA, 1995

Institution	1995 FTE	2000 FTE	Projected Growth	Increase (%)
Respiratory Therapist				
Hospital	369	375	6	1.5
Respiratory Therapy Technician				
Hospital	332	331	0	0.0

2,271 respiratory care personnel were employed in Georgia in 1995, approximately 32.1 per 100,000 population (GDOL, 1995). The U.S. Department of Labor estimates that 82,000 respiratory therapy personnel are active nationwide, 31.5 per 100,000 population (GDOL, 1995.)

The American Association for Respiratory Care estimates that 80 percent of respiratory personnel are employed in hospitals and approximately 6 percent of their membership reports employment in home health care. In Georgia, nearly 83 percent of respiratory care personnel are employed in hospitals, with only a small percentage located in nursing homes, home health care agencies, and other community-based services (GDOL, 1995). Based on the high level of hospital-based employment, trends in this sector are useful for establishing demand in respiratory therapy. Extrapolated for non-respondents, an estimated 50 therapists and 28 to 30 technician vacancies exist in hospitals across Georgia. Statewide, hospital vacancy rates for therapists and technicians have declined since the 1991 study of allied health professionals (Table 28). In 1995 the hospital respondents reported a 6.7 percent vacancy rate for therapists and 4.2 percent for technicians (Table 29).

For the time period 1995-2000, the Georgia hospital respondents report no growth in these categories (1.5% for therapists and 0% for technicians) (Table 30). Average annual job openings in Georgia are estimated at 70 due to growth and 30 due to separations (GDOL, 1995). The Bureau of Labor Statistics projects respiratory therapy as one of the fastest growing occupations between 1994 and

2005: employment is projected to increase by approximately 26,000 jobs, an increase of 36 percent over the 1994 employment (Table 6). The Georgia Department of Labor (1995) reports an increase of 33 percent in employment between 1995 and 2005, resulting in over 700 additional jobs. Much of the growth will likely be in outpatient rehabilitation services.

Summary

The supply of respiratory therapists in Georgia appears to be in near balance with demand, especially in inpatient settings. Educational programs in this field are now well distributed across Georgia, and technician and therapy programs are responsive to state and local demand. Because the current educational supply appears to meet demand, it is not surprising that the hospital vacancy rates in this profession in Georgia are low to moderate. Across allied health the demand for practitioners with higher skill levels generally has been greater than for those with lesser education and experience; this pattern is reflected in the slightly higher demand for respiratory therapists over technicians.

Across Georgia, however, both therapists and technicians show strong and steady employment in the hospital setting and enjoys shifts toward community settings. An aging population, population growth in the state, and replacement needs due to turnover will continue to result in openings for this professional across various regions of the state. Enrollments in respiratory therapy programs need to remain at current levels to meet the demand from current vacancies, attrition, and future growth, especially in outpatient settings.

Diagnostic and Radiologic Fields

Radiography

Radiologic health professionals, also called radiographers and (formerly) x-ray technicians, produce images for interpretation by radiologists. Radiographers are responsible for producing and processing radiographs that permit accurate interpretation of the human anatomy on x-ray film and/or computer display monitors.

Twenty-two programs of radiologic technology are offered in Georgia (JRCERT, 1996). Seven of the 22 are hospital based (Table 31). In 1993-94, the Georgia Department of Labor estimated 185 graduates from all of Georgia's programs (GDOL, 1995).

Nationally, the Bureau of Labor Statistics estimated employment for radiology technologists and technicians at 167,000 in 1994 (Table 6). As of March 1995, a total of 215,818 technologists were registered by the American Registry of Radiologic Technologists in one or more of seven areas of certification. A total of 267,513 certificates had been awarded. A total of 203,513 were registered in radiography, the largest certification area. In Georgia, 5,507 individuals held registration as radiographers (ARRT, 1996). These numbers include all registrants, active, inactive and retired.

Currently, approximately two-thirds of radiographers work in Georgia's hospital setting; and 20-25 percent work in offices and clinics of medical doctors (GDOL, 1995). Statewide the hospital respondents reported 751 fte radiographic positions with 16 fte budgeted vacancies (Table 32). Hospital vacancy rates for radiographers increased from 3.3 percent in 1986 to 6.2 percent in 1991, and then dropped in 1995 to 2 percent (Table 33).

Georgia hospital respondents predict less than a one percent growth in employment for this professional to 2000 (Table 34), although the Bureau of Labor projects that radiologic technologists and technicians will be one of the fastest growing occupations between 1995 and 2005, growing by 35 percent, an addition of 59,000 jobs (Table 6). The Georgia Department of Labor projects growth will add approximately 1,600 in employment by the year 2000, a growth rate of 36 percent (GDOL, 1995). The projected growth across Georgia as reported by the Department of Labor likely will not occur in the hospital setting, but perhaps will take place in outpatient settings.

TABLE 31
EDUCATIONAL PROGRAMS IN GEORGIA, DIAGNOSTIC AND RADIOLOGIC PROFESSIONS

Radiography

Albany Technical Institute
Athens Area Technical Institute
Armstrong State College
Brunswick College
Dekalb College
Emory University
Georgia Baptist Medical Center
Grady Health System
Griffin Technical Institute
Gwinnett Technical Institute
Hamilton Medical Center, Dalton
Medical College of Georgia
Medical Center of Central Georgia
Medical Center of Columbus, Inc.
Moultrie Area Technical Institute
Ogeechee Technical Institute
Okefenokee Technical Institute
Promina Kennestone Hospital, Marietta
Thomas Technical Institute
University Hospital, Augusta
Valdosta Technical Institute
West Georgia Technical Institute

Radiation Therapy Technologist

Armstrong State College
Grady Health Systems
Medical College of Georgia
Thomas Technical Institute

Diagnostic Medical Sonography

Medical College of Georgia
Grady Health Systems

Nuclear Medicine Technology

Medical College of Georgia
Emory University

Based on the number of budgeted vacancies reported by hospitals, approximately 40-50 fte positions should open annually in this setting for radiographers, due to separation, with few new positions opening as a result of growth. The Georgia Department of Labor estimates that 230 radiography positions should open annually in all settings, due to growth and separations.

The large number of programs across Georgia is sufficient to meet the demand for radiographers. Also the distribution of the programs will result in

TABLE 32
DIAGNOSTIC AND RADIOLOGIC PROFESSIONS EMPLOYMENT, 1995

Occupational Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Radiographer				
Hospital	751	16	767	2.0
Radiation Therapy Technologist				
Hospital	97	3	100	3.0
Diagnostic Medical Sonographer				
Hospital	86	0	86	0.0
Nuclear Medicine Technologist				
Hospital	97	3	100	3.0

a sensitivity to local employment ambitions; consequently, enrollment and graduations may be adjusted somewhat to meet local and regional variations in demand. As in Georgia, the supply and demand of radiographers nationwide are considered to be in balance (JRCERT, Mark Raymond, personal communication, 1996).

Radiation Therapy

Radiation therapists participate in the treatment of cancer and administer radiation as prescribed by oncologists. They also design patient treatment plans as well as provide psychological support to patients and their families. Radiation therapists are employed in hospitals and private radiation oncology centers as well as research, industry, education, and management positions.

Radiation therapists complete educational programs that are one, two or four years in length. The Medical College of Georgia, Armstrong State, Thomas Technical Institute, and Grady Health Systems offer radiation therapy programs in Georgia (Table 31). Since the beginning of the program at the Medical College of Georgia, 50 students have graduated with certificates, 18 with associate degrees, and 13 with bachelor's degrees (MCG, 1995).

TABLE 33
DIAGNOSTIC AND RADIOLOGIC PROFESSIONS VACANCY RATES, GEORGIA HOSPITALS, 1986, 1991, AND 1995,

Occupational Category	1986	1991	1995
Radiographer	3.3%	6.2%	2.0%
Radiation Therapy Technologist	6.4%	8.2%	3.0%
Diagnostic Medical Sonographer	5.1%	11.7%	0.0%
Nuclear Medicine Technologist	6.1%	5.8%	3.0%

Note: The vacancy rates are for all hospitals responding in each year. (1986= 116; 1991=104; 1995= 93).

A workforce study by the radiologic professional association found that over a four-year period, the number of full-time radiation therapists increased by 26 percent, from 4,242 in 1986 to 5,353 in 1990 (Langie, 1991). The survey found that nationwide 17 percent of radiation therapist positions were vacant and the average length of time to fill a vacancy was 27 weeks (Langie, 1991). According to ARRT, nationally there are 10,720 registered radiation therapy technologists; 246 are registered in Georgia (ARRT, 1995). This number includes active, inactive, and retired therapists.

Radiation therapists work in conjunction with physicians who treat cancer patients; therefore, these professionals are concentrated in the largest hospitals that offer treatments for patients diagnosed with cancer. Georgia hospital respondents in 1995 reported 97 fte positions, with 3 fte budgeted vacancies (Table 32). Georgia's vacancy rate increased slightly between 1986 and 1991 and then fell in the recent study (Table 33).

The Georgia hospital respondents project a 13 percent increase in the number of positions by 2000 (Table 34). Based on the small numbers of positions currently vacant and projections of moderate growth, supply and demand should be in near balance. The distribution of these professionals is expected to be uneven across the state, as these professionals will be found in the larger hospital settings. The current programs should be adequate to meet the statewide demand for radiation therapy technologists.

Diagnostic Medical Sonography

Diagnostic medical sonographers use ultrasound to image body tissues and to aid in the diagnosis and viewing of abdominal tumors, fetal development, and cardiac functioning.

The American Registry of Diagnostic Medical Sonographers administers a voluntary certification program for practitioners of diagnostic ultrasound and vascular technology. The Registry has over 27,000 members nationally. They offer three categories of sonography: registered diagnostic medical sonographer (RDMS), registered cardiovascular sonographer (RDCS) and registered vascular technologist (RVT). Over 100 educational programs are offered nationally. Georgia has sonography programs at the Medical College of Georgia and Grady Memorial Hospital (Table 31). In 1995 MCG graduated two students with certificates and two with baccalaureate degrees (MCG, 1995). Statewide, twenty-two graduated from programs in 1995 (GOICC, 1995).

TABLE 34
PROJECTED GROWTH OF DIAGNOSTIC AND RADIOLOGIC PROFESSIONS IN GEORGIA, 1995

Occupation	1995 FTE	2000 FTE	Projected Growth FTE	Increase (%)
Radiographer	767	771	4	0.5
Radiation Therapy Technologist	100	113	13	13.1
Diagnostic Medical Sonographer	86	101	15	17.1
Nuclear Medicine Technologist	100	113	13	13.0

Georgia hospital respondents reported 86 fte positions currently, with no budgeted vacancies (Table 32). The 1986 Georgia study of this field found a vacancy rate statewide of 5.1 percent (Table 33). By 1991 the statewide hospital vacancy rate had increased to 11.7 percent. In 1995, the Georgia responding hospitals did not report any vacancies; and yet they projected the addition of 15 positions (17% growth) to the year 2000 (Table 34). Based on this information, 15-30 new positions should be available in hospitals over the next five years. The present supply of graduates from Georgia programs should be adequate to meet this demand.

Nuclear Medicine Technology

Nuclear medicine technologists work with physicians to administer radioactive drugs and calculate appropriate dosage for the purpose of detecting or treating disease. Major areas of responsibility include patient care, preparation of radioactive drugs, performance of diagnostic testing, and operation and maintenance of computers and radiation detection equipment. Nuclear medicine technologists are employed in hospitals, research laboratories, government regulatory agencies, and commercial companies.

The Medical College of Georgia and Emory University offer the only nuclear medicine technology (NMT) programs in the state (Table 31). Students may earn certificates, associate, or baccalaureate degrees. A total of 49 students have graduated since 1990 from the Medical College of Georgia (MCG, 1995).

The American Registry of Radiologic Technologists (ARRT) reports that 11,642 nuclear medicine technologists were registered in 1995 (ARRT, 1995). ARRT reports that in Georgia 262 nuclear medicine technologists held certificates in good standing in October 1995. Nationwide, 90 percent of nuclear medicine technologists are hospital based. The Bureau of Labor Statistics reports that approximately 13,000 NMTs are active nationwide, and that employment in this field will grow to 16,000 in 2005, a 23 percent change (Table 6). The Georgia Department of Labor estimates that 280 NMTs are currently employed in Georgia and that growth will raise employment to 410 by 2005, a 46 percent growth in employment.

Since 90 percent of NMTs work in the hospital setting, currently filled positions, vacancy rates, and growth in this sector are of major importance.

Georgia hospital respondents reported 97 fte positions currently filled, with 3 fte budgeted vacancies (Table 32). Since 1986, hospital vacancy rates statewide have fallen from 6 to 3 percent (Table 33).

The Georgia hospital respondents projected a 13 percent growth between 1995 and 2000 in this position (Table 34). The Georgia Department of Labor estimates 20 openings annually, 10 from growth and 10 by separations. If hospitals across Georgia add the positions projected by both the Georgia Department of Labor and the hospitals from the recent survey, it is likely that the number of vacancies will increase. The Medical College of Georgia and Emory University will need to monitor the demand statewide to ensure a balance between supply and demand in this small field.

Medical Technologists and Medical Laboratory Technicians

Medical technologists (MTs) perform a variety of laboratory tests which contribute to the diagnosis and treatment of disease. They provide reliable results by controlling quality and confirming the accuracy of test results. Medical technologists work in five major areas: blood banking, chemistry, hematology, immunology, and microbiology. Medical technologists supervise laboratory technicians, and they may also engage in research and teaching.

Medical laboratory technicians (MLTs) perform general tests in all laboratory areas. They perform many tasks necessary to the functioning of a lab, including routine sample testing, record keeping, and maintaining equipment.

Table 35
Educational Programs in Georgia
Medical Technology & Medical Laboratory Technology

Medical Technology

Armstrong State College
Columbus College
Crawford Long Hospital of Emory University
Emory University Hospital
Georgia Southern University
Georgia State University
Grady Health Systems
Medical College of Georgia

Medical Laboratory Technician

Atlanta Area Technical Institute (Certificate)
Augusta Technical Institute (AD)
Brunswick College (AD)
Dalton College (AD)
Darton College (AD)
Dekalb Technical Institute (Certificate)
Lanier Technical Institute (Certificate)
Macon Technical Institute (Certificate)
North Georgia Technical Institute (Certificate)
Okefenokee Technical Institute (Certificate)
Thomas Technical Institute (AD & Certificate)

Positions for MLTs exist in hospitals, for-profit laboratories, clinics, nursing homes, public health facilities, business and industry. Technicians work under the supervision of pathologists or medical technologists.

Other laboratory personnel include histologic technicians and technologists, phlebotomy technicians, blood banking technologists, and cytotechnologists. These laboratory personnel were not included in this study of supply and demand in Georgia. A limited number of educational programs for these professionals are located in the Atlanta area.

TABLE 36
MEDICAL TECHNOLOGY GRADUATES IN GEORGIA
1992-1994

	1992	1993	1994
Armstrong	1	5	7
Georgia State	8	14	11
MCG	18	19	23
Columbus	6	11	10
USGA	33	49	51

Source: USGA Board of Regents, 1996.

Education

Medical technologists complete baccalaureate degree programs that include three years of course work and twelve months of clinical practice. Programs of medical technology are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The number of MT programs has declined from 615 in 1984 to 360 in 1996 (NAACLS, personal communication, 1996). NAACLS recognizes seven accredited medical technologist programs in Georgia. Three programs are hospital-based and four are in University System of Georgia institutions (Table 35). Georgia State University recently announced plans to close its medical technology program and has accepted its last entering class. In 1994, 51 graduates completed the MT baccalaureate degree in Georgia (Table 36).

In 1990 there were 256 accredited medical laboratory technology (MLT) programs, of which 215 were associate degree and 41 were certificate programs (CAHEA, 1991). The number of programs at this level has remained stable over the last decade, and currently, there are 224 associate degree and 35 certificate MLT programs nationwide. Twelve accredited MLT programs are located in Georgia: five associate degree and seven certificate (Table 35). Graduations from these programs have increased in recent years, reaching a high of 143 in 1993 (Table 37).

TABLE 37
MEDICAL LABORATORY TECHNOLOGY GRADUATES IN GEORGIA
1992-1994

	1992	1993	1994
Clayton State	2	1	4
Brunswick	12	6	11
Darton	5	6	10
Dalton	3	8	12
DTAE	69	122	90
Totals	91	143	127

Source: USGA Board of Regents, 1996; DTAE, 1996.

Supply: U.S. and Georgia

The Georgia Department of Human Resources' Office of Regulatory Services regulates hospital, independent, and other specialty laboratories in Georgia. As of June 1996, a total of 396 laboratories were licensed: 238 hospital and 158 independent and other. The Diagnostic Services Unit maintains a registry of personnel employed in all regulated laboratories and the distribution is as follows: medical technologist — 6,078; medical technologist supervisors — 1,692; and technician-level staff — 1,744. Thus, technologists in these laboratories in Georgia number 7,770.

Personnel working in licensed laboratories must be educated and/or certified by a body (e.g., the American Society of Clinical Pathologists, American Medical Technology) recognized by the state of Georgia's Regulatory Services Unit. Physician offices and clinics are not licensed by the Department, and the

TABLE 38
MT AND MLT EMPLOYMENT, 1995

Occupational Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Medical Technologist				
Hospital	885	31	916	3.4
Medical Laboratory Technician				
Hospital	311	19	330	5.8

personnel working in those settings are not included in these numbers, and their education and other qualifications in laboratory work are unknown.

According to the Department of Labor, an estimated 67 percent of MTs work in Georgia hospitals. An estimated 18 percent work in other medical laboratories, and 7 percent are in offices and clinics of medical doctors (GDOL, 1995). A much higher percentage (22%) of technicians work in the offices of medical doctors, and an estimated 56 percent work in hospitals (GDOL, 1995).

The American Society of Clinical Pathologists reports that 1,154 medical technologists in Georgia hold ASCP certification and 381 hold ASCP technician certification (ASCP, personal communication, 1996). The members holding certification by other certifying bodies are unknown.

Demand: U.S. and Georgia

Hospital vacancy rates provide a general indication of the demand for laboratory personnel due to the fact that more than one-half of the technician and technologists in this field work in the hospital setting. Based on the 1995 survey hospitals, the vacancy rate for technologists was just over 3 percent, down from over 6 percent in both 1986 and 1991 (Table 38 and 39). A national study by the American Clinical Pathologists' Board of Registry found vacancy rates for staff-level technologists to be just below 10 percent in 1994, the lowest since 1990 (Castleberry, et.al, 1995). The study reported that technologists vacancies in the South Central Atlantic region were slightly higher at 12.1 percent.

The vacancy rate in Georgia hospitals for technicians was at 6 percent in 1995, slightly higher than for technologists in the hospital setting. Technicians vacancies dropped from 10 percent in 1986 statewide to 5.7 percent in 1991, where it remains today (Table 39). The Board of Registry study reported a high vacancy rate of 14.8 percent for technicians nationwide, and 18.3 percent in the South Atlantic region (Castleberry, et al., 1995).

TABLE 39
MT AND MLT PERSONNEL VACANCY RATES,
GEORGIA HOSPITALS, 1986, 1991, AND 1995

Occupational Category	1986	1991	1995
Medical Technologist	6.3%	6.3%	3.4%
Medical Laboratory Technician	9.8%	5.7%	5.8%

Note: The vacancy rates are for all hospitals responding in each year. (1986= 116; 1991=104; 1995= 93)

It should be noted that statewide technologists outnumber technicians in licensed laboratories (including hospitals) by more than three to one, and this pattern may be observed in the data reported by the 1995 hospital respondents (Table 38). Thus, even though the vacancy rate for technicians is higher, numerically more technologists are needed to offset the technology vacancies.

For workforce assessments in this field, the Bureau of Labor Statistics uses the broad category "clinical laboratory technologists and technicians." Between 1994 and 2005, the BLS projects growth nationally in this category to be moderate at 12 percent; however, because of the size of the current workforce (i.e., 274,000), the net addition to employment is large at 33,000 jobs (Table 6). The Georgia Department of Labor projects growth in both technician employment and technologist employment from 1992 until 2005 (GDOL, 1995). Technologist employment is projected to grow by 813 positions (23%), and technician employment, by 461 positions (22%) (GDOL, 1995). Using the same database, average annual openings for technologists in Georgia are estimated at 240, 180 due to growth and 60 due to separations. Average annual openings for

TABLE 40
PROJECTED GROWTH OF MEDICAL TECHNOLOGISTS AND MEDICAL LABORATORY TECHNICIANS IN GEORGIA, 1995

Occupation	1995 FTE	2000 FTE	Projected Growth FTE	Increase (%)
Medical Technologist	916	950	34	3.8
Medical Laboratory Technician	330	343	13	3.7

technicians are estimated at 70, with 40 due to growth and 30 to separations (GOICC, 1995). In Georgia, the hospital respondents project growth between 1995 and 2000 to average about four percent for both technicians and technologists (Table 40). Numerically, three times as many technologists will be needed to satisfy this percentage growth due to the larger size of the workforce.

Summary

Based on the number of associate degree and certificate programs in medical laboratory technology in Georgia (n=12) and the smaller technician workforce, it appears that the current number of educational programs should be able to meet the current demand and projected future growth for technicians until the turn of the century. It is useful to note that the average annual openings for technologists in Georgia is estimated to be three times the number for technicians, while the state's educational programs produce more than twice the number of technician graduates as technology graduates. Based on the estimate of average annual openings for technicians and the lower number needed to satisfy current vacancies and projected growth in the hospital setting, the current supply and demand for technicians appear to be in balance.

The situation for technologists is less clear. First, the technologist workforce in the hospital and other settings is much larger than the technician workforce. Additionally, the educational output in numbers of technology graduates is also much lower. Currently, four University System of Georgia programs are meeting the demand for technologists, and the decision to close the Atlanta-based program at Georgia State University may have a negative impact on the

supply of technologists for the large number of hospitals and laboratories in the Atlanta MSA. Additionally, this decision may pose difficulties for the Atlanta area hospital programs that are accredited by NAACLS and offer clinical education.

The demand for technologists and technicians in independent laboratories was not assessed in this study. Based on the size of the tech workforce, a larger demand for technologists may exist in independent laboratories and is not reflected in this study. Consequently, the current medical technology programs should be supported to enlarge their recruitment efforts and be encouraged to graduate a larger number of technologists for projected future openings.

The state of Georgia might also consider licensure for individuals working in laboratory settings, both licensed labs and private offices, to ensure a qualified workforce serving all of the population. Several neighboring states have instituted licensure for this profession.

Health Information Administrators and Technologists

Health information administrators (formerly called medical records administrators) establish policies and determine how patient information data and other health-related information are handled. They are involved in administration, reimbursement, quality assurance, and utilization review activities. They support and provide assistance to medical and other professional staff to ensure that data are secure, accurate, and up-to-date. Health information technologists and coding specialists (formerly medical record technicians) work in cooperation with health information administrators.

Education

Health information programs are accredited by the Commission on Accreditation of Allied Health Education in cooperation with the American Health Information Management Association (AHIMA). Nationwide, there are 153 health information technology (associate degree) programs and 54 health information administration (baccalaureate degree) programs accredited by AHIMA (AHIMA, 1995). Georgia has two accredited technology programs and two accredited administrator programs. The Georgia Student Finance Authority's (GSFA) publication of 1994-95 educational programs lists twelve programs under the classification "medical record administration/health information

Table 41
Health Information Administration Graduates in Georgia, 1990-1994

	1990	1991	1992	1993	1994
MCG - B.S.	8	7	7	15	17
MCG - A.S.	0	1	1	2	1
Clark Atlanta	4	1	2	1	2
Totals	12	9	10	18	20

Source: MCG Fact Book, 1995; Clark Atlanta,1995.

management" in Georgia (GSFA, 1994). Obviously, the majority of these are not accredited.

The Medical College of Georgia has the longest-standing administrator program in the state. Fifty-four students have graduated from this baccalaureate program since 1990 (MCG, 1995). Clark Atlanta University started an administrator program in 1988 and graduated its first students in 1990: to date ten have graduated from the program. Since 1991, five students have graduated from MCG's associate degree program (Table 41). Darton College recently achieved accreditation for the state's only other associate degree program (AHIMA, 1996).

Graduates of AHIMA-accredited programs may apply for certification at three different levels. Registered Record Administrators (RRAs) must complete a bachelor's degree from an accredited program and pass a certification exam. Accredited Record Technicians (ARTs) must complete an associate degree from an accredited program and pass a credentialing exam. Recently, AHIMA added the Certified Coding Specialist (CCS) designation.

Supply: U.S. and Georgia

The Bureau of Labor Statistics estimates that 81,000 are employed nationwide as health information technologists, and that 126,000 will be employed in 2005, an increase of 45,000 (56%) (Table 6). This estimate includes health records personnel in all settings and from a variety of educational backgrounds. Based on the BLS data, this allied health occupation is projected as among the fastest growing over the next 10 years.

The American Health Information Management Association (1996) reports that there are 10,197 certified administrators (RRAs) and 17,899 certified technologists (ARTs) nationwide. In Georgia, a total of 715 ARTs and RRAs hold certification (AHIMA, 1995). In 1987, the American Medical Records Association (now AHIMA) reported 255 RRAs and 252 ARTs in Georgia (Morris, 1987). Thus, during the past decade the number of certified personnel in health information management in Georgia increased by just over 200. This growth may reflect new additions to the field as well as employed personnel successfully achieving certification.

Demand: U.S. and Georgia

Health information specialists may work in a variety of settings, including hospitals, nursing homes, home health agencies, as well as less traditional settings such as managed care organizations, insurance companies, and consulting firms. In the 1995 survey, hospital respondents reported 74 fte health information administrator positions and 3 fte budgeted vacancies. The hospital respondents employed almost twice as many technologists with 126 employed fte and 10 fte budgeted vacancies. Nursing home respondents reported 16 fte administrator positions, with 1 fte vacancy, and nearly three times as many technologist positions, 55 fte, with only 2 budgeted vacancies (Table 42).

Statewide, the hospital respondents reported a vacancy rate of 4 percent for administrators down from 9 percent in 1991 (Table 43). The technologist vacancy rate has remained around 7 percent in hospitals since 1991. Currently, technologist positions yield a 7.4 percent vacancy statewide. Overall, administrator vacancy levels in the hospital setting have declined since 1986, while vacancies for technologists have increased to 7.4 percent.

Georgia nursing homes projected a larger numerical growth (and percentage growth) than the Georgia hospitals for health information administrators and technologists (Table 44). When vacancies and projected growth are combined, Georgia nursing homes and hospitals will need 50 fte administrators and 80 fte technologists. Growth will also be reflected in other settings as health care continues to be delivered and managed through community-based and outpatient settings. The number of graduates from current accredited programs in Georgia cannot meet this amount.

TABLE 42
HEALTH INFORMATION EMPLOYMENT, 1995

Occupational Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Health Information Administrator				
Hospital	74	3	77	3.9
Nursing Home	16	1	17	5.8
Health Information Technologist				
Hospital	126	10	136	7.4
Nursing Home	55	2	57	3.5

TABLE 43
HEALTH INFORMATION PERSONNEL VACANCY RATES,
1986, 1991, AND 1995

Occupational Category	1986	1991	1995
Health Information Administrator			
Hospital	6.9%	9.0%	3.9%
Nursing Home	3.0%	2.0%	5.8%
Health Information Technologist			
Hospital	4.2%	7.1%	7.4%
Nursing Home	3.2%	5.5%	3.5%

Summary

The field of medical records will continue to expand as a result of the increased reliance on a patient's medical records for reimbursement purposes. Financial control and billing, in addition to legal documentation of quality of care, are increasingly based in the medical records of hospitals and outpatient services; consequently, accuracy, and a high level of professional skill are necessary in these positions.

Nationwide, among certified health information personnel, technologists outnumber administrators almost two to one, and in the Georgia hospital and

TABLE 44
PROJECTED GROWTH OF HEALTH INFORMATION ADMINISTRATORS AND
TECHNOLOGISTS IN GEORGIA, 1995

Occupation	1995 FTE	2000 FTE	Projected Growth FTE	Increase (%)
Health Information Administrator				
Hospital	77	86	9	12.4
Nursing Home	17	28	11	64.7
Health Information Technologist				
Hospital	136	140	4	2.7
Nursing Home	57	71	14	24.6

nursing home sectors, this distribution of personnel is evident. In the 1995 study, current demand was strongest for technologists in a hospital setting, while future growth appeared to be strongest in the nursing home setting for technologists and administrators.

The current demand for health information administrators and technologists in the state should be closely monitored, and the demand for certified personnel should be established. Based on the limited number of graduates from Georgia's four accredited programs, it appears likely that inpatient and outpatient settings may be filled by graduates of nonaccredited programs.

Other Allied Health Fields

Surgical Technology

Surgical technologists care for patients during the pre- and postoperative phase as well as during surgical procedures. They are employed in hospital, outpatient surgical centers, and in physician's offices. They also are referred to as operating room technicians (ORTs). This field is less uniform than many others in allied health, and requirements for utilization and licensure may vary greatly by state.

Surgical technologists complete educational programs leading to certificates, diplomas, or associate degrees, depending on the length of program. Nationally, 226 programs in surgical technology are recognized by the Association of Surgical Technologists; 142 are accredited by CAHEA (AST, 1995). Surgical Technologists may earn professional credentials by passing nationally administered certifying examinations and may be granted the designation of certified surgical technologist (CST) or CST first assistant (CST/CFA).

The surgical technologist supply in Georgia is drawn from 12 programs at 10 technical institutes, 1 proprietary college and 1 two-year college (AST, 1995). Only seven programs in Georgia are accredited by CAHEA in cooperation with the AMA: Okefenokee Technical Institute, Thomas Technical Institute, DeKalb Technical Institute, Savannah Technical Institute, Albany Technical Institute, Augusta Technical Institute, and Athens Technical Institute (Table 45). Certifying examinations are not required for practice in Georgia.

In 1990 an estimated 38,000 surgical technologists were active nationwide, 15.3 per 100,000 population (USDOL, 1991). In 1994, the Bureau of Labor Statistics estimated that 46,000 surgical technologists were employed nationwide and that total employment would increase by 41 percent to 59,000 jobs in 2005 (Table 6). The Georgia Department of Labor estimates that 1,500 surgical technologists were employed in Georgia in 1992, and projects 42 percent growth to 2,130 positions in 2005 (GDOL, 1995). Surgical technologists were cited by the Bureau of Labor Statistics as one of the fastest growing occupations over the 1994-2005 time period.

Because most states do not require licensure for this professional, including Georgia, determining the active supply statewide is quite difficult. Thus, the

TABLE 45
OTHER ALLIED HEALTH EDUCATIONAL PROGRAMS IN GEORGIA

Surgical Technology
Albany Technical Institute
Augusta Technical Institute
Athens Technical Institute
Okefenokee Technical Institute
Thomas Technical Institute
Dekalb Technical Institute
Savannah Technical Institute

Dietitian
Georgia State University
University of Georgia
Georgia Southern University
Life College of Atlanta
Fort Valley State College

Pharmacy
Mercer University
University of Georgia

Social Work
Abraham Baldwin Agricultural College
Andrew College
Atlanta Metropolitan College
Clark Atlanta University
Dalton College
Darton College
Fort Valley State College
Gainesville College
Georgia State University
Georgia Southern University
LaGrange College
Mercer University
Middle Georgia College
Oglethorpe University
Savannah State College
University of Georgia

TABLE 46
OTHER ALLIED HEALTH EMPLOYMENT, 1995

Occupational Category	Current Personnel FTE	Budgeted Vacancies FTE	Total FTE	Vacancy Rate (%)
Surgical Technology				
Hospital	353	33	386	8.4
Dietitian				
Hospital	314	37	351	10.5
Nursing Home	47	2	49	4.1
Pharmacist				
Hospital	503	31	534	5.9
Nursing Home	24	0	24	0.0
Social Work				
Hospital	346	29	375	7.7
Nursing Home	138	3	140	1.8
Home Health Care	63	6	69	8.7

demand in hospital and outpatient surgical centers becomes most important for interpreting need. The 1995 Georgia hospital respondents reported 353 fte surgical technology positions and 33 fte budgeted vacancies for a vacancy rate of 8.4 percent (Table 46). In the 1986 statewide study, the hospital vacancy rate for surgical technologists was 7.9 percent, and in 1991, 8.2 percent (Table 47). Over the ten-year period, the demand for surgical technologists as expressed by hospital vacancy rates has remained steady at 8 percent.

Georgia hospitals project that this profession will grow at a 5.5 percent rate through 2000 (Table 48). Based on information extrapolated from Georgia hospital responses, annually 76 or more positions should become available from vacancies, growth, and separations. The Georgia Department of Labor estimates 70 or more openings for surgical technologists annually (GDOL, 1995). Currently 124 students graduate from Georgia surgical technology programs every year. This number should be adequate to meet current demand. However, Georgia should explore the possibility of having more of the state's current programs accredited.

Dietitians

Dietitians shape the food choices and influence the nutritional status of many people. In Georgia, more than 30 percent of dietitians work in health care institutions, though many dietitians are in business, education, and community settings. Overall, healthcare accounts for 7 out of 10 jobs in this field (Byrk and Soto, 1994).

Nationwide, there are 234 didactic programs approved by the American Dietetic Association (ADA). There are several educational routes leading to registration status (RD). Five didactic programs in dietetics are offered at educational institutions in Georgia: Georgia State, University of Georgia, Georgia Southern, Life College of Atlanta, and Fort Valley (Table 45). Three hospitals in Georgia (i.e., Henry General Hospital in Stockbridge, University Hospital in Augusta, and Emory University Hospital in Atlanta) participate in dietetic internships and/or pre-professional practice programs. There are 70 dietetic technician programs accredited/approved by the ADA (ADA, 1994); none are in Georgia. Achieving registration by the American Dietetics Association (ADA) is important to graduates of professional programs. Annually,

TABLE 47
OTHER ALLIED HEALTH PERSONNEL VACANCY RATES,
1986, 1991, AND 1995

Occupational Category	1986	1991	1995
Surgical Technologist			
Hospital	7.9%	8.2%	8.4%
Dietitian			
Hospital	6.3%	11.2%	10.5%
Nursing Home	4.2%	5.5%	4.1%
Pharmacist			
Hospital	9.0%	6.9%	5.9%
Social Worker			
Hospital	**	10.6%	7.7%
Home Health Care	**	10.7%	8.7%

** = Not measured in this survey.

TABLE 48
PROJECTED GROWTH OF OTHER ALLIED HEALTH PROFESSIONALS IN GEORGIA, 1995

Occupation	1995 FTE	2000 FTE	Projected Growth FTE	Increase (%)
Surgical Technologist				
Hospital	386	407	21	5.5
Dietitian				
Hospital	351	373	22	6.4
Nursing Home	49	62	13	26.5
Pharmacist				
Hospital	534	555	21	3.9
Nursing Home	24	34	10	41.7
Social Worker				
Hospital	375	385	10	2.8
Nursing Home	140	162	22	15.7
Home Health Care	69	100	31	43.8

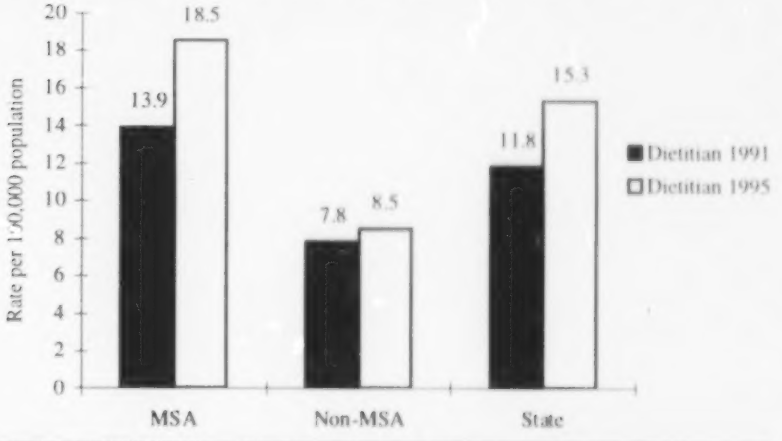
approximately 50 students graduate from Georgia's ADA-approved programs.

As of 1995, 53,000 dietitians and nutritionists were employed in the United States and its territories (Table 6). The American Dietetics Association suggests that the majority of those employed in this BLS category are registered dietitians (Kornblum, 1994). Ninety percent of dietitians are white; 98 percent are women; and 41 percent work in hospitals, followed by 9 percent in extended care. Unemployment was very low: less than 2 percent of registered dietitians were seeking employment (Bryk and Soto, 1994).

The Georgia Department of Labor estimates that 2,382 dietitians and nutritionists are living in Georgia (GDOL, 1995). In the fall of 1995, 1,079 dietitians were licensed in Georgia (SEB, 1995). According to the ADA, 1,125 dietitians are registered in Georgia (Pat Swann, personal communication, 1996).

In 1995 the national practitioner-to-population rate for dietitians was 20.4 per 100,000 population. The rate was much lower in Georgia in 1995, 15.3 per 100,000 population (SEB, 1995). However, the rate had risen significantly since 1991, when it was 11.8 per 100,000. More dietitians practice in urban areas, than

FIGURE 9
RATES OF DIETITIANS,
GEORGIA URBAN AND RURAL, 1991 AND 1995



in rural areas, and the number of dietitians in urban areas rose at a significantly higher rate than those in rural areas between 1991 and 1995 (Figure 9).

Georgia hospitals reported employing a larger number of dietitians than nursing homes, 314 fte and 47 fte, respectively (Table 46). Hospitals also reported a larger vacancy rate, 10.5 percent (37 fte budgeted vacancies), than nursing homes, 4.1 percent (2 fte budgeted vacancies). In 1986, the Georgia hospital vacancy rate for dietitians was 6.3 percent. The rate nearly doubled in 1991, increasing to 11.2 percent. In 1995, the rate dropped slightly, to 10.5 percent (Table 47). The vacancy rate in nursing homes remained between 4 and 5 percent, from 1986 to 1995.

The Georgia Department of Labor projects a 14 percent growth rate in this profession for the period 1995-2005, and estimates 80 or more openings annually (GDOL, 1995). Georgia hospital respondents predicted they would increase employment of dietitians by 6.4 percent, while nursing home respondents projected a 26.5 percent growth by 2000 (Table 48). The Bureau of Labor Statistics projected nationally the number to grow to 63,000 in 2005, a 19 percent growth rate and an increase of 10,000 jobs (Table 6). This rate of growth is well

above the national average but is not as fast as in some other allied health fields. Driving the increased demand is the use of high-technology nutrition services, such as enteral and parenteral nutrition; the aging of the population and associated dietary needs; and consumer demand for nutritional advice (Institute of Medicine, 1989).

The relationship between nutrition and health status clearly has been demonstrated; graduates from professional programs in dietetics are needed to educate the public about this connection and to speak knowledgeably to the public's interest in these relationships. Additionally, the public's interest in health and nutrition will continue to grow in concert with the aging of the "baby-boom" generation. Also, RDs are needed to provide patient services in health care institutions and other community settings.

The current demand and projected growth in this profession remains strong and has been consistent across the decade, 1986-1995. The state should monitor the supply of this professional and of those who purport to have nutrition expertise. The current number of programs should be able to meet demand for professional dietitians.

Pharmacists

Pharmacists are involved in the compounding and distribution of drugs and have done so for over 100 years. As the complexity of drugs have increased, the role of the pharmacist has changed and expanded, especially in hospitals. Pharmacists work with health care teams to provide important information to physicians and patients.

Nationally 75 pharmacy colleges are accredited by the American Council on Pharmaceutical Education, and these programs offer baccalaureate and/or Doctor of Pharmacy (Pharm.D.) degrees (AACP, 1994). Over 40,000 students are enrolled in pharmacy programs annually; 63 percent are women and 11 percent are minorities. According to AACP, pharmacy student enrollment peaked in 1975, declining until 1983. Between 1984 and 1993 there was a 41.3 percent increase in the numbers of students enrolling in pharmacy programs. Approximately 7,400 first professional degrees in pharmacy are awarded annually.

Mercer University and the University of Georgia offer pharmacy education programs in Georgia (Table 45). Mercer offers only the Doctor of Pharmacy

degree. UGA offers both the baccalaureate and Pharm.D. degree. Approximately 260 students graduate from these programs yearly (GOICC, 1995). At UGA, the number of graduates in the BS program increased until 1989, then decreased by 32 percent, while the number of Pharm.D. graduates has nearly doubled (UGA factbook, 1995).

As the third largest health care profession, over 174,000 pharmacists were employed nationally in 1995 (USDOL, 1995). Slightly over 31 percent work in health services, such as hospitals, nursing homes and home health care agencies (GDOL, 1995). Approximately 4,700 pharmacists work in Georgia (GDOL, 1995) Approximately 8,400 pharmacists hold licenses in Georgia, though many do not practice in the state (SEB, 1996).

In 1995 Georgia hospital respondents reported 503 fte pharmacists as currently employed in their institutions, with 31 fte budgeted vacancies (5.9%) (Table 46). Nursing home respondents identified 24 fte pharmacists, with no budgeted vacancies. Between 1986 and 1991, the hospital vacancy rate for pharmacists has declined from 9 percent to 6.9 percent. Since 1991, the vacancy rate has held relatively steady, decreasing slightly to 5.9 percent (Table 47).

Nationally the number of pharmacists employed is expected to increase 21 percent to 211,000 in the next 10 years (USDOL, 1995). In Georgia the number of pharmacists is projected to increase by 25 percent to 5,800 in 2005 (GOICC, 1995). In the 1995 survey, responding hospitals projected 3.9 percent growth, an increase of 21 fte positions by 2000. Nursing home respondents estimated the addition of 10 fte positions, an increase of 41.7 percent (Table 48).

The supply of and demand for pharmacists in Georgia appears to be in balance and projected growth will be met by future additions to the workforce from the current educational programs and inmigration into Georgia.

Social Work

Social workers help individuals and groups solve personal and social problems. They interview clients to identify their problems, provide counseling, develop plans to meet their needs, and determine eligibility for assistance, funds and services. Social workers are employed in many types of settings, and health care institutions are only one of those areas.

Sixteen programs in social work are offered at institutions of higher education in Georgia (Table 45). Social workers must be licensed by the

Georgia Composite Board of Professional Counselors, Social Workers, and Marriage and Family Therapists to practice clinical social work (SEB, 1995). Applicants for licensure must have a master's degree in social work, approved experience, and pass a written examination. Clark Atlanta, Georgia Southern, and the University of Georgia offer the only masters of social work programs in the state. Approximately 340 students graduate yearly from Georgia social work programs (GOICC, 1995).

Nationwide, the social work field is large with 557,000 employed in 1995; however, this number reflects employment in all areas of social work, not medical social workers alone (Table 6). Projected growth to the year 2005 will bring total employment to 744,000, a 34 percent increase (Table 6). Currently, an estimated 6,500 social workers are active in Georgia; of these, approximately 2,000 are classified by the Georgia Department of Labor as "medical and psychiatric" social workers. Between 1992 and 2005, employment in Georgia for health care social workers is expected to grow 53 percent from 2,089 to 3,189 positions (GDOL, 1995). There are an estimated 110 average annual openings in Georgia due to growth and separations from the workforce.

Over half of social workers in Georgia are employed in health services, with 43 percent by hospitals, 8 percent by nursing homes, and 3 percent by home health care agencies (GDOL, 1995). Georgia hospitals reported the highest number of social workers in the survey, 346 fte positions (Table 46). Nursing homes reported 138 fte current personnel, while home health care agencies reported 63 fte current personnel (Table 46). Although hospitals reported the highest number of budgeted vacancies, 29 fte, the highest vacancy rate was reported by home health care, 8.7 percent (Table 47). An estimated 80 fte vacancies likely exist in the major institutional settings in Georgia. Rural hospitals reported a higher vacancy rate (9%) than urban hospitals (7%). The hospital vacancy rate for social workers has declined since 1991 in both the hospital and home health care setting, from 10.6 percent (Table 47).

Growth in the social work profession is projected in nursing homes, home health care agencies, and hospitals statewide. Hospitals project the slowest growth, 2.8 percent to 2000, followed by nursing homes, increasing 15.7 percent (Table 48). Home health care, with the smallest number of social workers, projects the greatest growth, 43.8 percent (Table 48). Overall, 100 medical

social workers would be needed over the next five years to fill newly established positions.

The need for medical social workers will continue to increase as health care settings and services restructure and as patients need assistance in dealing with changes in the delivery system. It is likely that rural areas and small hospitals will experience the greatest difficulty in attracting and retaining qualified medical social workers.

Findings and Conclusions

In 1995, the state of Georgia claimed an estimated 7 million residents, a significant increase from the approximately 4 million Georgians in 1960. Over the 35 years, Georgia's health care system has rapidly expanded in numbers of health care personnel, types of personnel, places of service, and educational programs. For example, in 1959 Georgia had 3,498 physicians, approximately 90 per 100,000 population (Fincher, 1962). By 1994, a total of 12,709 physicians practiced in Georgia, 182 per 100,000 population. Much of this growth reflects the increasing specialization and technological changes in health care; consequently, subspecialists account for 58 percent of the overall 1994 supply.

The relationship between educational program productivity and workforce supply is dramatically revealed in the growth of registered nurses. In 1962, Georgia claimed 7,195 registered nurses, that number climbed to just over 36,000 in 1984, and up to over 61,000 licensed RNs in July 1995 (Fincher, 1962; Morris, 1987). In 1962, 282 nurses per 100,000 population were estimated nationwide. Today, the rate of active RNs nationally has climbed to 755 per 100,000 population.

In June 1961, 18 programs of professional nursing (RN) held National League of Nursing accreditation in Georgia, and 13 of these were hospital-based diploma programs (Fincher, 1962). In 1995, Georgia educational institutions offered 20 associate degree programs, 18 baccalaureate programs, and 10 master's degree programs (GBN, 1995). In this decade, Georgia Baptist College of Nursing discontinued the last diploma program in Georgia and this institution joined the ranks of baccalaureate education. Most hospital-based programs merely closed, and currently many associate degree programs are moving toward baccalaureate degrees.

Beginning in the 1960s, advances in medical treatment, the emergence of sophisticated technology, and the introduction of Medicare and Medicaid supported the expansion of traditional health care professions and the emergence and growth of many allied health professions. Rapid growth occurred in educational programs and access to health care improved dramatically for large sectors of the population, especially the aged and disadvantaged population. Increases in program availability brought about increasing enrollments and

graduation rates well into the 1980s. In the late 1980s, the number of programs in most fields leveled off, and new programs were only added in fields that remained undersupplied, e.g., physical therapy, occupational therapy, and nursing. Other programs were added in previously underserved geographic areas. The numbers of professionals in all fields, however, continued to climb as the record number of programs in the 1990s graduated larger numbers than in previous years. This scenario developed nationally and in Georgia over the decades between 1960 and 1990.

For example, in 1962, Georgia had just passed the physical therapy licensure act. Of the 76 physical therapists in Georgia at the time, only 48 were qualified for registration with the American Registry of Physical Therapists; only 36 actually practiced. There were no educational programs in the state. Currently, 4 accredited programs of physical therapy and 1 developing program are offered in Georgia. In August 1995, there were 148 accredited programs and 41 developing programs nationwide. More than 2,300 licensed physical therapists currently reside in Georgia.

The changes in occupational therapy education and practitioners are similar. In Georgia in 1962, occupational therapists were not licensed by the state, but a total of 25 were considered active and were registered with the American Occupational Therapy Association, who set the standards for practice (Fincher, 1962). In 1976, Georgia required state licensure of occupational therapists (the second state to do so), and by 1983, a total of 353 were licensed for practice and 250 were considered active in Georgia (Morris, 1987). By 1995, Georgia's instate licensees numbered 1,039, an estimate 13.3 active OTs per 100,000 population. In the 1960s, Georgia did not have an educational program for occupational therapists; today, one baccalaureate program is in place.

Reflecting the increasing levels of specialization across all of health care, programs of physical therapy assisting and occupational therapy assisting have grown dramatically. In the 1980s, one program in occupational therapy assisting was completing the first level of accreditation approval in Georgia. Currently, one OTA program is accredited and another is developing. Similarly, in physical therapy assisting, one accredited and one "candidate status" program were in place in the 1985. Ten years later, three programs in Georgia hold accreditation and four are developing.

The trends highlighted above can be observed across all of the fields in this study: growth in programs nationwide and in Georgia, increase in graduates across the state and nationally, and overall growth in the health care work force. In education, the shifts from hospital-based training to college-based education occurred across three decades: and today, few hospitals offer complete educational programs, but remain as partners in meeting clinical education requirements.

The rapid expansion of freestanding programs in health care may come to a close in the next decade, as educational programs and institutions look to share resources and tap the latest technologies to deliver education to populations at distant locations. Health programs across the state are exploring the opportunities in distance education through the interactive classrooms linked by the Georgia Statewide Academic and Medical System (GSAMS). For example, programs in health information management currently are offered by the Medical College of Georgia with Dekalb College on the Dekalb campus. The instructor's primary base is MCG, but allowances are made for on-site visits by the faculty to the Dekalb campus. Other cooperative efforts are underway and in development. Distance education in the form of interactive audio and video, along with other individual approaches to education, e.g., computer-based and internet courses, will emerge as more important in educational planning in the future.

Educational institutions were not the only source of change over the past three decades. Since 1960 dramatic changes have taken place in the health care workplace. Nationwide, the number of hospitals has continued to decline, and inpatient days have decreased in favor of outpatient surgery and community-based care. The rapid growth of home health care agencies and managed care delivery systems has shifted employment settings from hospitals to outpatient settings. In the 1970s and 1980s, hospitals were the major employer for the overwhelming majority of allied health professionals and nurses. Currently, in many of these fields (e.g., physical therapy and occupational therapy) over one-half of employment is now community based. This shift in employment has created new challenges in assessing the demand for health care professionals. Contractual services, temporary agencies, and private practice professionals do not report staffing patterns to state health agencies as is done by hospitals,

nursing homes, and home health agencies. The level of employment and demand by emerging health care providers is difficult to ascertain, and new methods to assess the demand by this market must be developed if educational institutions are able to plan programs, develop class sizes, and attempt to meet demand through educational productivity.

Based on institutional data and estimates of overall supply in Georgia, this research shows the supply and demand of professionals in Georgia in a wide range of fields that appears to be in near balance. In nursing, the demand for nurses at a 5.3 percent vacancy rate in the responding hospitals is the lowest reported since 1986. The growth area in nursing, however, is for nurse practitioners, and Georgia nursing programs seem ready to respond to this demand. A review of the data (Appendix C) shows that since 1986 in the hospital setting vacancy rates for professionals have declined. The exceptions are in physical therapy and occupational therapy, two fields where demand remains high and the increased employment by this professional in outpatient settings places hospitals at a competitive disadvantage. Vacancy rates below 5 percent are considered standard (acceptable), at 5-10 percent — average, and above 10 percent — high. Of the 23 occupations surveyed through the hospital setting, 8 exhibited low rates, 8 moderate rates, and 7 high rates. The fields with high vacancy rates were professions with long-standing high vacancy rates (e.g., physical therapy, occupational therapy) and smaller professions with current rapid increase in growth.

In summary, the long-standing vacancy rates noted in earlier studies appear to be less severe in the recent survey. Current and envisioned changes in the organization and delivery of health care services seemingly have suppressed, at least temporarily, demand and slowed turnover in the hospital setting. The impact of managed care on supply and demand in the outpatient sector is as yet undetermined.

The data from this and the previous health studies show that Georgia's health care professionals are not evenly distributed across the state and large discrepancies in urban and rural practitioner-to-population ratios continue to be evident across Georgia. The 1995 data, however, points to improvement in the rural rates of practitioners in several of the fields (e.g., physical and occupational therapy, nurse practitioners, dietitians, physician assistants). Georgia's Area

Health Education Centers (AHEC) have been instrumental in this change. Through regional planning and implementation of health care objectives, the AHECs in Albany, Columbus, and Dublin have succeeded in improving the distribution of health care professionals and in increasing the availability of educational programs in these and surrounding rural areas of the state. The expansion of AHECs statewide before the end of the decade will be important to continuing the progress made to date in extending health care and health care professionals to underserved populations.

In conclusion, assessing the supply of and demand for health care professionals has never been more challenging. Changes in delivery systems, educational programs, workforce composition, and the emergence of managed care have shifted conventional wisdom and practice. No longer will aggregate data suffice in serving the state's need for more detailed information. To effectively and efficiently plan for workforce needs in the next decade, efforts must be renewed to establish Georgia's licensure data as a source of information on the current workforce. Licensure data could provide information on type of employment, length of practice, geographic distribution, educational preparation, and a wide variety of other key variables in workforce and educational planning. Additionally, a workforce data base that includes not only hospital and nursing home data, but employment information on other settings will be essential for education and workforce planning.

In summary, the state of Georgia has made great progress in healthcare overall in the last three decades. Increases have been made in the total healthcare workforce; educational programs have multiplied and are more accessible than ever before; and health care professionals are better distributed than at any previous time. The challenge of the next decade will be to maintain a quality workforce and an adequate supply as health care managers attempt to control costs and extend services through managed care networks.

References

American Academy of Physician Assistants. (January, 1995). "Overview of the PA Profession." *PA Careers Magazine*, p.30.

American Association of Colleges of Pharmacy. (1994). *Overview of AACP*. [On-line]. Available at: http://www.aacp.org.

American Association for Respiratory Care. (1996). *What is an RCP?* [On-line]. Available at: http://www.aarc.org/whatarcp.htm.

American Association for Respiratory Care. (July, 1996). Personal communication with Sherry Milligan.

American College of Nurse-Midwives. (1995). *ACNM Facts*. Washington, D.C. American Dietetic Association. (1995). *Directory of Dietetics Programs: 1994-1995*. Chicago: ADA.

American Health Information Management Association. (1995). *Membership Information*. Unpublished data.

American Hospital Association. (March 25, 1996). "AHA Survey: Hospitals' Community Roots Growing." *AHA News, 32*(12).

American Medical Association. (1993). *Allied Health Education Directory, 1993* (20th ed.). Milwaukee: American Medical Association.

American Occupational Therapy Association. (February, 1996). *Health Care and Market Reform: Workforce Implications for Occupational Therapy*. Washington, D.C.: Health Policy Alternatives.

American Occupational Therapy Association. (February, 1994). *Occupational Therapy Careers*.

American Occupational Therapy Association. (January, 1994). *Occupational Therapy Manpower*.

American Physical Therapy Association. (1996). *APTA Web site*. [On-line]. Available at: http://www.apta.org.

American Physical Therapy Association. (1995). *Decade: A Historic Perspective of Physical Therapy Education*.

American Physical Therapy Association. (1994). *1994 PT Professional Education Program Fact Sheet*.

American Registry of Radiologic Technologists. (October, 1995). *Registered Technologists by State*. Unpublished data.

American Society of Clinical Pathologists. (July, 1996). Personal communication.

Association of Surgical Technologists. (1995). *Surgical Technology: A Growing Career*.

Bachtel, Douglas C. and Susan R. Boatwright, eds. (1995). *The Georgia County Guide 1995*. (14th ed.). Athens, GA: College of Agricultural and Environmental Services.

Bryk, Joseph A. and Tami Kornblum Soto. (December, 1994). "Report on the 1993 Membership Database of The American Dietetic Association." *Journal of the American Dietetic Association*, *94*(12), p.1433-1438.

Castleberry, Barbara M., Terri Yablonsky and Laurie Wargelin. (February, 1994). "1994 Wage and Vacancy Survey of Medical Laboratories: Modest Salary Increases Respond to High Vacancy Rates," *Laboratory Medicine*, *26*,(2), pp.106-112.

Center for Rural Health and Research. (1995). *Census of Georgia Nurse Practitioners, Certified Nurse Midwives, and Physician Assistants*. Statesboro, GA: College of Health and Professional Studies, Georgia Southern University.

Commission on Accreditation of Allied Health Educational Programs. (1994). *Accredited Educational Programs in Health Information (Medical Records) Technology*. Chicago: American Health Information Management Association.

Cook, James F. (1994). *Compensation for Laboratory Personnel*. Chicago: American Society of Clinical Pathologists.

Emory University. (July, 1996). Personal communication, Barbara Jones, Physical Therapy.

Emory University. (July, 1996). Personal communication, Nurse Midwives program.

Fincher, Cameron. (1962). *Nursing and Paramedical Personnel in Georgia: A Survey of Supply and Demand*. Atlanta: Georgia State College.

Georgia Board of Examiners of Licensed Practical Nurses. (October, 1995). *Approved Practical Nursing Programs*. Unpublished report.

Georgia Board of Examiners of Licensed Practical Nurses. (October, 1995). *LPN Renewal Survey - 1995*. Unpublished report.

Georgia Board of Nursing. (1995). *RN Renewal Survey - 1995*. Unpublished report.

Georgia Board of Nursing. (1996). *Nursing Program Directory*. Unpublished data.

Georgia Board of Public Health. (1996). *Total Public Health Nurses for the State of Georgia*. Unpublished report.

Georgia Department of Adult and Technical Education. (1996). *Graduates for Selected Health Programs FY1991-FY1995 in Georgia's Postsecondary Institutes*. Unpublished data.

Georgia Department of Adult and Technical Education. *(1995). All Health Programs By Institute as of November 1995.* Unpublished data.

Georgia Department of Labor. (1995) *Occupational Employment Statistics: Distribution by Industry, 1992 and Projected 2005.* Atlanta: Georgia Department of Labor.

Georgia Hospital Association and Health Manpower Planning Committee. (1991). *As Basic as 2+2=4: Addressing Georgia's Health Care Shortage.* Marietta, GA.

Georgia Occupational Information Coordinating Committee. (1995). *Georgia Occupational Information System: Georgia's Supply and Demand Data for Education and Training Planning.* Atlanta, GA: Georgia Career Information Center, Georgia State University.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Certified Nurse Specialist. Unpublished data.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Dietitians. Unpublished data.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Nurse Midwives. Unpublished data.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Nurse Practitioners. Unpublished data.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Occupational Therapy. (Therapist and Assistant). Unpublished data.

Georgia Secretary of State, State Examining Boards. (August, 1996). Personal communication, Pharmacy Division.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Physical Therapy. (Therapist and Assistant). Unpublished data.

Georgia Secretary of State, State Examining Boards. (1995). Roster of Physician Assistants. Unpublished data.

Georgia Student Finance Authority. *Georgia's Post-Secondary Schools: 1995-1996.* Atlanta: GSFA, 1995.

Goldstein, Marc and Lisa L. Culver. (1995). Human Resources Estimates for Physical Therapists in the United States through August 1995. *American Physical Therapy Association* [On-line]. Available at: http://www.apta.org/research/hum_res.html.

Governor's Health Care Commission. (1993). *Addressing the Supply of Nursing Personnel in Georgia.* Atlanta.

Gwyer, Jan. (January, 1995). "Personnel Resources in Physical Therapy: An Analysis of Supply, Career Patterns, and Methods to Enhance Availability." *Physical Therapy, (75)*1, p. 56-65.

Institute of Community and Area Development. (1994). *The Interactive Atlas of Georgia.* Athens, GA: The University of Georgia.

Institute of Medicine. (1989). *Allied Health Services: Avoiding Crises*. Washington, D.C.: National Academy Press.

Joint Board of Family Practice, State of Georgia. (1994). *Physician Profile: Toward the Year 2000*. Atlanta.

Joint Review Committee on Education in Radiologic Technology. (1996). *JRCERT-Accredited Educational Programs: Radiography*. Chicago: JRCERT.

Kornblum, Tami. (January, 1994). "Professional Demand for Dietitians and Nutritionists in the Year 2005." *Journal of the American Dietetic Association, 94*(1), p. 21-22.

Langie, C. (December, 1991). "Are RTTs Leading Manpower Surge?" *R.S. Wavelength, 3*(3), p.3.

Morgan, Kathleen, Scot Morgan, and Neal Quitno. (1995). *Health Care State Rankings, 1995*. Lawrence, KS: Quitno Press.

Morris, L. V. (1987). *Health Professions Personnel in Georgia*. Athens, GA: Institute of Higher Education, The University of Georgia.

Morris, L. V. (1992). *Education and the Workforce: Georgia's Health Professions in the 1990s*. Athens, GA: Institute of Higher Education, The University of Georgia.

Morris, L. V. (1989). *The Supply of and Demand for Selected Health Professionals in the Georgia CHEP/AHEC Service Area*. Athens, GA: Institute of Higher Education, The University of Georgia.

Morris, Libby V. (1994). "Dependence in the Rural South." *Southern Rural Sociology, 10*(1), p. 115-130.

Moses, E.B. (1993). *The Registered Nurse Population, Findings From the National Sample Survey of Registered Nurses, March 1992*. Washington, D.C.: U.S. Department of Health and Human Services, Public Health Service, Division of Nursing, Health Resources and Services Administration, 1993.

National Accrediting Agency for Clinical Laboratory Sciences. (1993). *Inventory of Clinical Laboratory Scientist/ Medical Technologist Programs*. Unpublished data.

National Accrediting Agency for Clinical Laboratory Sciences. (July, 1996). Personal communication.

National Board for Respiratory Care. (March 4, 1996). Personal communication.

Office of Institutional Research and Information. Medical College of Georgia. (1995). *MCG Factbook, 1995*. Augusta, GA.

Raymond, Mark. (July, 1996). Personal communication.

Silvergeit, Ira. (September 8, 1994). "The Workforce of the '90s." *OT Week*, p. 20-23.

Silvergeit, Ira. (September 15, 1994). "The High Demand for OTRs and COTAs." *OT Week*, p. 20-22.

University System of Georgia Board of Regents. (1994). *1993-94 Information Digest*. Atlanta, GA: Office of Research and Planning.

University System of Georgia Board of Regents. (1996). *Graduates for Selected Health Programs FY1991-FY1995 in USGA Institutes*. Unpublished data.

U.S. Department of Health and Human Services, Office of Graduate Medical Education. (1981). *Report of the Graduate Medical Education National Advisory Committee to the Secretary, Department of Health and Human Services* (vol. 1, GMENAC Summary Report). DHHS Publication No HRA 81-651. Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Division of Nursing. (1995). *Estimated Supply of Registered Nurses by Educational Preparation and Geographic Area: December 1992*. Unpublished data.

U.S. Department of Labor, Bureau of Labor Statistics. (November, 1995). "Outlook: 1995-2005, Occupational Employment Projections, 1995-2005." *Monthly Labor Review*.

U.S. Department of Labor, Bureau of Labor Statistics. (November, 1993). "Outlook: 1993-2005, Occupational Employment Projections, 1990-2005." *Monthly Labor Review*.

University of Georgia. (1995). *1995 University of Georgia Factbook*. Athens, GA: Office of Institutional Research.

Waugaman, Wynne R. and Scott D. Foster. (Summer, 1995). "CRNAs: An Enviable Legacy of Patient Service." *Advanced Practice Nurse Quarterly*, p.21-28.

Willis, J.B. (1993). *Journal of the American Academy of Physician Assistants, 6*, p. 418-422.

Zwemer, J.D. (1990). *Needs Assessment: Selected Allied Health Professions in Georgia 1990-2000*. Augusta, GA: Office of Educational Research and Information, Medical College of Georgia.

Zsembik, B. A. (October 16-18, 1985). "Where Have All the Doctors Gone?: An Examination of the Dispersion of Physicians Across Counties." Presented at the Annual Meeting of the Southern Regional Demographic Group. Austin, TX.

APPENDICES

Appendix A
Personnel in Georgia Hospitals, 1995

Occupational Category	Current Personnel FTE*	Budgeted Vacancies FTE*	Total FTE*	Vacancy Rate (%)
Dietitian	314	37	351	10.5
RN	10,219	572	10,791	5.3
Nurse Practitioner	44	23	67	34.3
Nurse Anesthetist	55	7	62	11.3
Nurse Midwife	37	1	38	2.7
Practical Nurse (LPN)	3,247	219	3,466	6.3
Occupational Therapist	134	30	164	18.0
Occupational Therapy Assistant	37	13	50	26.0
Physical Therapist	231	54	285	19.1
Physical Therapy Assistant	130	18	148	12.3
Pharmacist	503	31	534	5.9
Radiographer	751	16	767	2.0
Radiation Therapy Technologist	97	3	100	3.0
Diagnostic Medical Sonographer	86	0	86	0.0
Nuclear Medicine Technologist	97	3	100	3.0
Respiratory Therapist	344	25	369	6.7
Respiratory Therapist Technician	318	14	332	4.2
Surgical Technologist	353	33	386	8.4
Medical Laboratory Technician	511	29	540	5.8
Medical Technologist	886	30	916	3.3
Health Information Administrator	74	3	77	3.9
Health Information Technician	126	10	136	7.4
Social Worker	346	39	385	9.9

n= 93 hospitals

* All FTE are rounded to the nearest whole number

Appendix B
Projected Growth, Georgia Hospitals, 1995-2000

Occupational Category	1995 FTE*	2000 FTE*	Projected Growth FTE*	Increase (%)
Dietitian	351	373	22	6.4
RN	10,791	10,658	-133	0.0
Nurse Practitioner	67	108	41	61.4
Nurse Anesthetist	62	61	-1	0.0
Nurse Midwife	38	49	11	29.3
Practical Nurse (LPN)	3,466	3,325	-141	0.0
Occupational Therapist	164	195	31	19.1
Occupational Therapy Assistant	50	78	28	56.0
Physical Therapist	285	340	55	19.5
Physical Therapy Assistant	148	185	37	25.1
Pharmacist	534	555	21	3.9
Radiographer	767	771	4	0.5
Radiation Therapy Technologist	100	113	13	13.1
Diagnostic Medical Sonographer	86	101	15	17.1
Nuclear Medicine Technologist	100	113	13	13.0
Respiratory Therapist	369	375	6	1.5
Respiratory Therapist Technician	332	331	-1	0.0
Surgical Technologist	386	407	21	5.5
Medical Laboratory Technician	330	343	13	3.7
Medical Technologist	916	950	34	3.8
Health Information Administrator	77	86	9	12.4
Health Information Technician	136	140	4	2.7
Social Worker	375	385	10	2.8

n=93 hospitals

* All FTE are rounded to the nearest whole number.

Appendix C
Vacancy Rates, Georgia Hospitals, 1986, 1991, and 1995

Occupational Category	1986	1991	1995
Dietitian	6.3%	11.2%	10.5%
RN	9.4%	12.5%	5.3%
Nurse Practitioner	4.5%	12.4%	34.3%
Nurse Anesthetist	5.1%	12.6%	11.6%
Nurse Midwife	**	10.0%	2.7%
Practical Nurse (LPN)	4.2%	8.6%	6.3%
Occupational Therapist	16.1%	21.6%	18.0%
Occupational Therapy Assistant	6.6%	13.4%	26.0%
Physical Therapist	15.1%	19.8%	19.1%
Physical Therapy Assistant	7.3%	11.5%	12.3%
Pharmacist	9.0%	6.9%	5.9%
Radiographer	3.3%	6.2%	2.0%
Radiation Therapy Technologist	6.4%	8.2%	3.0%
Diagnostic Medical Sonographer	5.1%	11.7%	0.0%
Nuclear Medicine Technologist	6.1%	5.8%	3.0%
Respiratory Therapist	10.2%	8.9%	6.7%
Respiratory Therapist Technician	4.9%	6.2%	4.2%
Surgical Technologist	7.9%	8.2%	8.4%
Medical Laboratory Technician	9.8%	5.7%	5.8%
Medical Technologist	6.3%	6.3%	3.4%
Health Information Administrator	6.9%	9.0%	3.9%
Health Information Technician	4.2%	7.1%	7.4%
Social Worker	**	10.6%	7.7%

Note: The vacancy rates are for all hospitals responding in each year (1986=116; 1991=104; 1995=93).

** = Not measured in this survey.

Appendix D
Personnel in Georgia Nursing Homes, 1995

Occupational Category	Current Personnel FTE*	Budgeted Vacancies FTE*	Total FTE*	Vacancy Rate (%)
Registered Nurse	560	47	607	7.7
Practical Nurse (LPN)	1,861	88	1,949	4.5
Nursing Aide	5,078	364	5,442	6.7
Nurse Practitioner	22	1	23	4.3
Social Worker	138	3	140	1.8
Physical Therapist	53	6	59	9.4
Physical Therapy Assistant	71	7	78	9.0
Occupational Therapist	46	2	48	4.1
Occupational Therapy Assistant	23	2	25	8.0
Dietitian	47	2	49	4.1
Pharmacist	24	0	24	0.0
Health Information Administrator	16	1	17	5.8
Health Information Technician	55	2	57	3.5

n=122 nursing homes

* All FTE are rounded to the nearest whole number.

Appendix E
Projected Growth, Georgia Nursing Homes, 1995-2000

Occupational Category	1995 FTE*	2000 FTE*	Projected Growth FTE*	Increase (%)
Registered Nurse	607	725	118	19.4
Practical Nurse (LPN)	1,949	2,153	204	10.5
Nursing Aide	5,442	5942	500	9.2
Nurse Practitioner	23	35	12	52.2
Social Worker	140	162	22	15.7
Physical Therapist	59	88	29	49.2
Physical Therapy Assistant	78	107	29	37.2
Occupational Therapist	48	80	32	66.7
Occupational Therapy Assistant	25	50	25	100.0
Dietitian	49	62	13	26.5
Pharmacist	24	34	10	41.7
Health Information Administrator	17	28	11	64.7
Health Information Technician	57	71	14	24.6

n=122 nursing homes

* All FTE are rounded to the nearest whole number.

Appendix F
Personnel in Georgia Home Health Care Agencies, 1995

Occupational Category	Current Personnel FTE*	Budgeted Vacancies FTE*	Total FTE*	Vacancy Rate (%)
RN	1,577	92	1,668	5.5
LPN	392	23	415	5.4
Home Health Aide	1,759	63	1,822	3.5
Occupational Therapist	21	17	37	44.7
Physical Therapist	117	28	146	19.4
Social Worker	63	6	69	8.7

n=41 agencies

* All FTE are rounded to the nearest whole number.

Appendix G
Projected Growth, Georgia Home Health Care Agencies, 1995-2000

Occupational Category	1995 FTE*	2000 FTE*	Projected Growth FTE*	Increase (%)
RN	1,668	2,337	669	40.1
LPN	415	530	115	27.8
Home Health Aide	1,822	2,373	551	30.2
Occupational Therapist	37	66	29	76.3
Physical Therapist	146	216	70	48.0
Social Worker	69	100	31	43.8

n=41 agencies

* All FTE are rounded to the nearest whole number.

Appendix H
Practitioner per 100,000 Population Rates, Georgia, 1995

County	1994 Pop.	PT	PTA	OT	OTA	CNS	NM	NP	PA	Diet
Appling	16,169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0
Atkinson	6,535	0.0	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bacon	10,379	9.6	9.6	0.0	0.0	0.0	0.0	9.6	9.6	9.6
Baker	3,692	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.1
Baldwin	41,310	29.0	4.8	12.1	0.0	12.1	0.0	7.3	31.5	26.6
Banks	11,052	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0
Barrow	34,414	14.5	8.7	5.8	0.0	2.9	0.0	5.8	5.8	2.9
Bartow	61,674	13.0	1.6	4.9	0.0	0.0	0.0	13.0	3.2	14.6
Ben Hill	17,149	17.5	0.0	5.8	0.0	0.0	0.0	5.8	5.8	5.8
Berrien	15,214	0.0	19.7	0.0	0.0	0.0	0.0	0.0	6.6	0.0
Bibb	154,802	27.1	4.5	20.7	3.2	1.9	0.6	12.9	12.3	16.1
Bleckley	10,753	0.0	9.3	18.6	9.3	0.0	0.0	9.3	0.0	9.3
Brantley	12,342	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brooks	15,582	0.0	12.8	6.4	0.0	0.0	0.0	0.0	6.4	6.4
Bryan	19,942	20.1	10.0	10.0	0.0	0.0	0.0	20.1	25.1	15.0
Bulloch	47,835	16.7	4.2	10.5	0.0	0.0	2.1	31.4	2.1	14.6
Burke	21,602	0.0	0.0	0.0	4.6	0.0	0.0	13.9	0.0	4.6
Butts	15,631	6.4	0.0	6.4	0.0	0.0	0.0	0.0	38.4	6.4
Calhoun	4,940	0.0	0.0	0.0	0.0	0.0	0.0	20.2	0.0	0.0
Camden	41,662	7.2	0.0	2.4	2.4	0.0	4.8	7.2	2.4	0.0
Candler	8,477	47.2	23.6	0.0	0.0	0.0	0.0	23.6	0.0	0.0
Carroll	76,563	17.0	5.2	13.1	2.6	0.0	1.3	9.1	2.6	3.9
Catoosa	46,478	17.2	4.3	2.2	0.0	0.0	4.3	6.5	2.2	10.8
Charlton	9,232	0.0	0.0	0.0	0.0	0.0	0.0	10.8	10.8	0.0
Chatham	225,223	41.7	5.8	24.0	3.1	2.7	0.9	16.4	16.9	16.4
Chattahoochee	15,645	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8	0.0
Chattooga	22,764	4.4	0.0	4.4	0.0	0.0	0.0	13.2	4.4	4.4
Cherokee	108,854	28.5	5.5	11.9	1.8	1.8	0.9	7.3	8.3	14.7
Clarke	90,257	54.3	12.2	28.8	2.2	4.4	5.5	16.6	15.5	13.2
Clay	3,455	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clayton	194,8[illegible]	16.9	3.1	7.7	2.6	2.1	1.5	6.7	4.1	3.1
Clinch	6,421	31.1	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0
Cobb	508,922	53.6	8.1	18.9	2.2	5.3	2.6	12.4	13.4	22.8
Coffee	32,038	15.6	0.0	6.2	0.0	1.0	0.0	12.5	6.2	9.4
Colquitt	37,530	13.3	8.0	5.3	2.7	1.0	0.0	8.0	5.3	2.7

County	1994 Pop.	PT	PTA	OT	OTA	CNS	NM	NP	PA	Diet
Columbia	79,922	22.5	6.3	18.8	6.3	1.3	0.0	10.0	40.0	12.5
Cook	14,009	21.4	7.1	0.0	0.0	7.1	0.0	0.0	0.0	0.0
Coweta	67,799	10.3	7.4	8.8	1.5	1.5	0.0	5.9	5.9	8.8
Crawford	9,826	0.0	10.2	0.0	0.0	0.0	0.0	0.0	XXX	0.0
Crisp	20,634	9.7	9.7	9.7	0.0	0.0	0.0	9.7	19.4	9.7
Dade	13,911	21.6	7.2	7.2	0.0	0.0	0.0	0.0	0.0	0.0
Dawson	11,340	35.3	8.8	0.0	0.0	0.0	8.8	26.5	0.0	8.8
Decatur	26,223	11.4	7.6	0.0	0.0	0.0	0.0	0.0	0.0	3.8
Dekalb	577,787	29.6	4.7	14.9	2.6	6.6	5.2	17.3	32.4	21.3
Dodge	17,849	5.6	0.0	0.0	0.0	0.0	0.0	5.6	5.6	0.0
Dooly	10,256	0.0	9.8	0.0	0.0	0.0	0.0	19.5	0.0	9.8
Doughtery	98,008	37.8	10.2	7.1	3.1	0.0	0.0	9.2	27.5	16.3
Douglas	79,863	17.5	6.3	6.3	1.3	1.3	2.5	1.3	10.0	6.3
Early	12,084	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	0.0
Echols	2,187	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Effingham	30,499	13.1	3.3	9.8	0.0	0.0	0.0	13.1	3.3	6.6
Elbert	19,110	10.5	15.7	0.0	0.0	0.0	5.2	5.2	0.0	0.0
Emanuel	20,941	0.0	4.8	4.8	4.8	0.0	0.0	23.9	14.3	4.8
Evans	9,275	32.3	0.0	0.0	0.0	0.0	0.0	21.6	10.8	0.0
Fannin	17,047	23.5	0.0	5.9	0.0	0.0	5.9	11.7	0.0	5.9
Fayette	75,928	42.1	2.6	11.9	2.6	6.6	2.6	11.9	7.9	18.4
Floyd	83,284	48.0	6.0	22.8	3.6	3.6	3.6	8.4	21.6	14.4
Forsyth	56,827	31.7	7.0	7.0	3.5	1.8	1.8	1.8	7.0	7.0
Franklin	17,451	34.6	11.5	22.9	0.0	0.0	0.0	0.0	0.0	11.5
Fulton	690,534	68.5	6.7	32.3	4.5	9.4	6.2	24.0	35.6	27.9
Gilmer	15,134	13.2	6.6	6.6	0.0	0.0	0.0	6.6	6.6	13.2
Glascock	2,346	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glynn	65,020	30.8	3.1	10.8	4.6	1.5	0.0	15.4	18.5	6.2
Gordon	37,733	10.6	0.0	13.3	5.3	0.0	0.0	13.9	5.3	2.7
Grady	21,165	9.4	14.2	0.0	0.0	0.0	0.0	14.2	14.2	4.7
Greene	12,046	0.0	0.0	23.7	0.0	0.0	0.0	15.8	0.0	7.9
Gwinnett	434,030	47.7	14.5	17.5	2.5	3.0	2.3	11.8	23.0	21.0
Habersham	29,256	30.5	16.9	0.0	3.4	0.0	0.0	6.8	3.4	6.8
Hall	104,966	46.7	4.8	12.4	3.8	2.9	4.8	8.6	14.3	8.6
Hancock	9,077	11.0	0.0	0.0	0.0	0.0	0.0	11.0	11.0	0.0
Haralson	23,014	4.3	8.7	0.0	0.0	0.0	0.0	4.3	4.3	0.0
Harris	19,797	5.1	5.1	0.0	0.0	0.0	5.1	40.4	55.6	10.1
Hart	20,430	19.6	9.8	4.9	0.0	0.0	0.0	9.8	4.9	4.9
Heard	9,299	10.8	0.0	10.8	0.0	0.0	10.8	10.8	10.8	0.0

County	1994 Pop.	PT	PTA	OT	OTA	CNS	NM	NP	PA	Diet
Henry	78,814	15.2	5.1	2.5	2.5	1.3	1.3	10.2	16.5	10.2
Houston	98,337	23.4	9.2	11.2	4.1	2.0	0.0	7.1	2.1	9.2
Irwin	8,570	0.0	0.0	11.7	0.0	0.0	0.0	11.7	0.0	0.0
Jackson	33,077	12.1	12.1	9.1	0.0	0.0	0.0	15.1	0.0	9.1
Jasper	8,981	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0
Jeff Davis	12,272	8.1	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jefferson	17,672	5.7	5.7	0.0	0.0	5.7	0.0	5.7	5.7	11.3
Jenkins	8,563	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Johnson	8,396	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0
Jones	21,651	4.6	0.0	0.0	0.0	0.0	0.0	4.6	13.9	0.0
Lamar	13,646	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
Lanier	6,148	0.0	0.0	0.0	0.0	0.0	0.0	16.3	0.0	0.0
Laurens	42,263	47.3	2.4	11.8	2.4	2.4	0.0	2.4	7.1	26.0
Lee	18,967	42.2	0.0	0.0	0.0	5.3	0.0	15.8	26.4	21.1
Liberty	59,042	0.0	1.7	5.1	5.1	0.0	0.0	6.8	13.5	1.7
Lincoln	7,916	0.0	12.6	12.6	0.0	0.0	0.0	0.0	12.6	0.0
Long	7,374	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lowndes	82,179	32.9	11.0	21.9	0.0	3.7	2.4	11.0	7.3	13.4
Lumpkin	16,346	42.8	6.1	24.5	0.0	0.0	6.1	12.2	18.4	0.0
Macon	13,147	114.1	0.0	7.6	0.0	15.2	0.0	0.0	7.6	7.6
Madison	22,874	4.4	4.4	4.4	0.0	4.4	4.4	8.7	0.0	4.4
Marion	6,164	0.0	16.2	0.0	0.0	0.0	0.0	16.2	32.4	0.0
McDuffie	21,217	18.9	0.0	4.7	4.7	0.0	0.0	4.7	4.7	0.0
McIntosh	9,133	0.0	0.0	10.9	0.0	0.0	0.0	10.9	0.0	0.0
Meriwether	23,001	78.3	4.3	52.2	0.0	0.0	0.0	4.3	4.3	4.3
Miller	6,234	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0
Mitchell	20,687	0.0	9.7	0.0	0.0	0.0	4.8	4.8	14.5	0.0
Monroe	18,512	21.6	16.2	5.4	5.4	0.0	0.0	10.8	16.2	16.2
Montgomery	7,657	13.1	0.0	26.1	0.0	0.0	0.0	13.1	13.1	0.0
Morgan	13,785	7.3	7.3	14.5	0.0	0.0	0.0	7.3	0.0	7.3
Murray	29,004	6.9	0.0	0.0	0.0	0.0	3.4	6.9	6.9	0.0
Muscogee	187,103	36.3	6.4	11.2	3.2	3.7	0.5	12.8	20.8	16.0
Newton	48,375	16.5	4.1	0.0	0.0	0.0	0.0	8.3	4.1	8.3
Oconee	20,194	74.3	29.7	24.8	0.0	0.0	9.9	34.7	14.9	44.6
Oglethorpe	10,637	0.0	9.4	0.0	0.0	0.0	0.0	9.4	0.0	0.0
Paulding	55,718	3.6	7.2	1.8	1.8	0.0	0.0	5.4	1.8	3.6
Peach	22,748	8.8	0.0	0.0	0.0	0.0	0.0	8.8	0.0	4.4
Pickens	16,286	18.4	0.0	0.0	0.0	0.0	0.0	24.6	12.3	6.1
Pierce	14,437	13.9	0.0	0.0	0.0	0.0	0.0	48.5	0.0	0.0
Pike	10,933	9.1	0.0	9.1	0.0	0.0	0.0	27.3	0.0	0.0

County	1994 Pop.	PT	PTA	OT	OTA	CNS	NM	NP	PA	Diet
Polk	34,606	5.8	0.0	5.8	0.0	0.0	0.0	0.0	5.8	2.9
Pulaski	8,238	12.1	0.0	0.0	0.0	0.0	0.0	12.1	0.0	0.0
Putnam	15,619	6.4	12.8	0.0	12.8	0.0	0.0	12.8	12.8	19.2
Quitman	2,377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rabun	12,238	8.2	16.3	0.0	0.0	0.0	0.0	8.2	8.2	16.3
Randolph	8,130	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Richmond	196,032	57.6	21.4	58.7	12.2	9.2	0.5	18.4	25.5	39.8
Rockdale	62,032	29.0	8.1	8.1	0.0	3.2	0.0	6.4	11.3	22.6
Schley	3,730	0.0	0.0	0.0	0.0	0.0	26.8	26.8	0.0	0.0
Screven	14,126	0.0	0.0	21.2	0.0	0.0	0.0	14.2	0.0	0.0
Seminole	9,258	10.8	10.8	21.6	0.0	0.0	0.0	0.0	0.0	0.0
Spalding	57,016	15.8	1.8	1.8	1.8	0.0	0.0	1.8	5.3	12.3
Stephens	24,735	36.4	4.0	12.1	4.0	4.0	0.0	12.1	0.0	24.3
Stewart	5,472	0.0	0.0	0.0	0.0	0.0	0.0	36.5	18.3	0.0
Sumter	31,347	12.8	6.4	3.2	0.0	6.4	12.8	16.0	3.4	19.1
Talbot	6,743	0.0	0.0	0.0	0.0	0.0	0.0	29.7	14.8	0.0
Taliaferro	1,821	164.7	54.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tattnall	18,167	0.0	11.0	0.0	0.0	0.0	0.0	5.5	27.5	27.5
Taylor	7,918	0.0	0.0	12.6	0.0	0.0	0.0	12.6	0.0	0.0
Telfair	11,579	0.0	0.0	0.0	8.6	0.0	0.0	17.3	17.3	112
Terrell	10,901	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thomas	40,336	34.7	29.8	19.8	0.0	2.5	12.4	7.4	19.8	27.3
Tift	35,494	25.4	8.5	14.1	2.8	0.0	0.0	0.0	45.1	16.9
Toombs	24,842	24.2	4.0	0.0	0.0	0.0	0.0	16.1	28.2	12.1
Towns	7,350	27.2	0.0	0.0	13.6	0.0	0.0	27.2	0.0	0.0
Treutlen	5,960	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Troup	57,611	27.8	1.7	6.9	0.0	0.0	3.5	6.9	1.7	13.9
Turner	8,905	0.0	0.0	11.2	0.0	0.0	0.0	11.2	11.2	22.5
Twiggs	9,892	10.1	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Union	13,606	14.7	22.0	7.3	7.3	0.0	0.0	14.7	29.4	14.7
Upson	26,762	18.7	7.5	11.2	3.7	0.0	3.7	7.5	7.5	0.0
Walker	59,911	10.0	8.3	3.3	6.7	0.0	0.0	1.7	5.0	3.3
Walton	44,703	11.2	2.2	0.0	0.0	0.0	0.0	2.2	6.7	2.2
Ware	35,630	5.0	5.6	8.4	0.0	0.0	0.0	5.6	14.0	0.0
Warren	6,105	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Washington	19,815	5.0	0.0	0.0	0.0	0.0	0.0	10.1	10.1	15.1
Wayne	24,277	4.1	0.0	0.0	0.0	0.0	0.0	12.4	8.2	12.4
Webster	2,255	0.0	0.0	0.0	0.0	0.0	0.0	44.3	0.0	0.0
Wheeler	4,817	0.0	0.0	0.0	0.0	0.0	0.0	20.8	0.0	0.0

County	1994 Pop.	PT	PTA	OT	OTA	CNS	NM	NP	PA	Diet
White	14,591	20.6	0.0	0.0	0.0	0.0	6.9	6.9	6.9	0.0
Whitfield	76,729	19.5	5.2	16.9	3.9	0.0	3.9	20.9	9.1	10.4
Wilcox	7,084	0.0	0.0	14.1	0.0	0.0	0.0	14.1	14.1	14.1
Wilkes	10,562	28.4	28.4	0.0	0.0	0.0	0.0	9.5	28.4	0.0
Wilkinson	10,490	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worth	21,213	9.4	14.1	0.0	0.0	0.0	0.0	4.7	4.7	4.7
State	**7,055,336**	**32.1**	**6.9**	**14.7**	**2.6**	**0.5**	**2.3**	**12.4**	**16.3**	**17.1**

Note: Rates are based on data provided by State Examining Boards. Licensees reported address of residence.